gaSteam 45/90/180 HD002

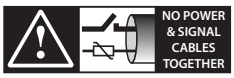
microprocessor electronic controller

CAREL

ENG User manual

LEGGI E CONSERVA QUESTE ISTRUZIONI

READ AND SAVE THESE INSTRUCTIONS



READ CAREFULLY IN THE TEXT!

Technology & Evolution

IMPORTANT WARNINGS

The CAREL S.p.A. humidifiers are advanced products, whose operation is specified in the technical documentation supplied with the product or can be downloaded, even prior to purchase, from the website www.carel.com. Each CAREL S.p.A. product, in relation to its advanced level of technology, requires setup/configuration/programming/commissioning to be able to operate in the best possible way for the specific application. The failure to complete such operations, which are required/indicated in the user manual, may cause the final product to malfunction; CAREL S.p.A. accepts no liability in such cases.
The customer (manufacturer, developer or installer of the final equipment) accepts all liability and risk relating to the configuration of the product in order to reach the expected results in relation to the specific final installation and/or equipment. CAREL S.p.A. may, based on specific agreements, acts as a consultant for the installation/commissioning/use of the unit, however in no case does it accept liability for the correct operation of the humidifier and the final installation if the warnings or suggestions provided in this manual or in other product technical documents are not heeded. In addition to observing the above warnings and suggestions, the following warnings must be heeded for the correct use of the product:

DANGER OF ELECTRIC SHOCK
The humidifier contains live electrical components. Disconnect the mains power supply before accessing inside parts or during maintenance and installation;
DANGER OF WATER LEAKS
The humidifier automatically and constantly fills/drains certain quantities of water. Malfunctions in the connections or in the humidifier may cause leaks;
DANGER OF BURNS
The humidifier contains high temperature components and delivers steam at 100°C/212°F.

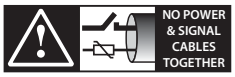
The conditions of the environment, the fuel and the power supply voltage must comply with the specified values.
All other uses and modifications made to the appliance that are not authorised by the manufacturer are considered incorrect.
Liability for injury or damage caused by the incorrect use of the appliance lies exclusively with the user.
Please note that the appliance is connected to the gas mains, contains live electrical devices and hot surfaces.
All service and/or maintenance operations must be performed by specialist and qualified personnel who are aware of the necessary precautions and are capable of performing the operations correctly and in accordance with the safety standards and legislation in force, with specific reference to:
1. Italian law 1083/71: "Safety standards relating to the use of gaseous fuel";
2. Italian Law no. 46/90: "Safety standards relating to systems in buildings";
3. Italian Presidential Decree no. 447, December 6, 1991: "Regulations for the enforcement of law no. 46, dated March 5, 1990, on safety relating to systems in buildings";
4. Italian Law 10/91: "Regulations for the enforcement of the national plan for energy savings and the development of renewable sources of energy".
Disconnect the appliance from the mains power supply before accessing any internal parts. The local safety standards in force must be applied in all cases.

Warning:

The installation of the product must include an earth connection, using the special yellow-green terminal available in the humidifier.

The environmental and power supply conditions must conform to the values specified on the product rating labels.
The product is designed exclusively to humidify rooms either directly or through distribution systems (ducts).
Only qualified personnel who are aware of the necessary precautions and able to perform the required operations correctly may install, operate or carry out technical service on the product.
Only water with the characteristics indicated in this manual must be used for steam production.
All operations on the product must be carried out according to the instructions provided in this manual and on the labels applied to the product. Any uses or modifications that are not authorised by the manufacturer are considered improper. CAREL S.p.A. declines all liability for any such unauthorised use. Do not attempt to open the humidifier in ways other than those specified in the manual.
Observe the standards in force in the place where the humidifier is installed.
Keep the humidifier out of the reach of children and animals.
Do not install and use the product near objects that may be damaged when in contact with water (or condensate). CAREL S.p.A. declines all liability for direct or indirect damage following water leaks from the humidifier.
Do not use corrosive chemicals, solvents or aggressive detergents to clean the inside and outside parts of the humidifier, unless specifically indicated in the user manual.
Do not drop, hit or shake the humidifier, as the inside parts and the linings may be irreparably damaged.

CAREL S.p.A. adopts a policy of continual development. Consequently, CAREL reserves the right to make changes and improvements to any product described in this document without prior warning. The technical specifications shown in the manual may be changed without prior warning.
The liability of CAREL S.p.A. in relation to its products is specified in the CAREL S.p.A. general contract conditions, available on the website www.carel.com and/or by specific agreements with customers; specifically to the extent where allowed by applicable legislation, in no case will CAREL S.p.A., its employees or subsidiaries be liable for any lost earnings or sales, losses of data and information, costs of replacement goods or services, damage to things or people, downtime or any direct, indirect, incidental, actual, punitive, exemplary, special or consequential damage of any kind whatsoever, whether contractual, extra-contractual or due to negligence, or any other liabilities deriving from the installation, use or impossibility to use the product, even if CAREL S.p.A. or its subsidiaries are warned of the possibility of such damage.



READ CAREFULLY IN THE TEXT!

Warning: separate as much as possible the probe and digital input signal cables from the cables carrying inductive loads and power cables to avoid possible electromagnetic disturbance.
Never run power cables (including the electrical panel wiring) and signal cables in the same conduits.

DISPOSAL

The humidifier is made up of metal parts and plastic parts. In reference to European Union directive 2002/96/EC issued on 27 January 2003 and the related national legislation, please note that:
1. WEEE cannot be disposed of as municipal waste and such waste must be collected and disposed of separately;
2. the public or private waste collection systems defined by local legislation must be used. In addition, the equipment can be returned to the distributor at the end of its working life when buying new equipment;
3. the equipment may contain hazardous substances: the improper use or incorrect disposal of such may have negative effects on human health and on the environment;
4. the symbol (crossed-out wheeled bin) shown on the product or on the packaging and on the instruction sheet indicates that the equipment has been introduced onto the market after 13 August 2005 and that it must be disposed of separately;
5. in the event of illegal disposal of electrical and electronic waste, the penalties are specified by local waste disposal legislation.

Warranty on the materials: 2 years (from the date of production, excluding consumables).

Approval: the quality and safety of CAREL S.P.A. products are guaranteed by the ISO 9001 certified design and production system, as well as by the CE mark.

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1. GENERAL CHARACTERISTICS OF THE MAIN CONTROL BOARD

Fig. 1.a

This is a microprocessor electronic controller developed by CAREL for the management of all models of humidifier.
It is made up of two electronic boards, positioned one on top of the other and connected together by pin strip:

- bottom board - "main control board": connected to the board with the microprocessor and the clock card, as well as the serial card;
- top board, or "expansion board".

The controller is designed to run the control program, and is fitted with the set of terminals required for connection to the controlled devices (for example: valves, power contactors) and to the field (probes, external controller).

The program and the parameters are saved in FLASH MEMORY, meaning the data is safe even in the event of a power failure (without the need for a backup battery).

The controller can be connected to pLAN (pCO Local Area Network) and tLAN networks.

Connection to the supervisor/telemaintenance serial line on the RS485 standard is ensured by fitting the controller with optional cards, using the CAREL, Modbus® or ECHELON®, RS232 and GSM communication protocols.

Terminal block

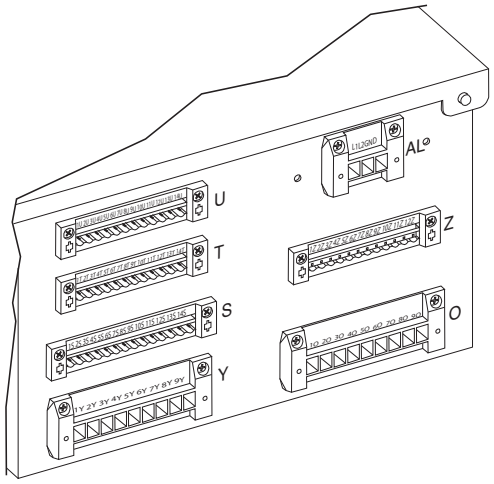


Fig. 1.b

2. CONTROL SIGNALS FROM THE FIELD

2.1 Humidity or temperature control

The humidifier can be configured to ensure the desired humidity or temperature value. It can be controlled in the following four different ways:

a) Type C control: ON/OFF

The humidifier is operated by a mechanical humidistat H, by a voltage-free remote contact CR, or by a combination of the two, which must be connected to terminals 7U, 8U, 9U and 10U on terminal block U in the electrical panel.

The diagrams in Fig. 2.b show the connections to be made in the case of:

a) operation controlled by a simple remote contact (CR);

b) operation by external mechanical humidistat (H);

c) a combination of the two.

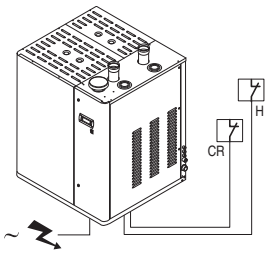


Fig. 2.a

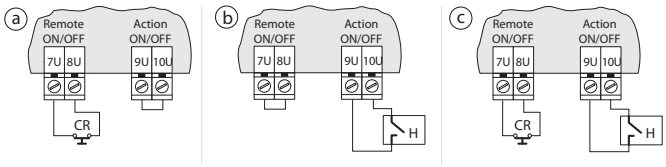


Fig. 2.b

b) Type P control:

proportional control, with signal sent by an external controller.

Steam production is managed by an external controller R, which sends the controller a humidity request signal (Fig. 2.c); the controller can be programmed to receive one of the following proportional signals (see par. 7.2):

- voltage: 0 to 1 Vdc; 0 to 10 Vdc; 2 to 10 Vdc;
- current: 0 to 20 mA , 4 to 20 mA.

The reference (zero) of the external controller must be connected to the GND terminal (2U) and the control signal to terminal B1 on terminal block U.

To avoid unstable control, the earth of the external controller must be connected to the earth of the controller.

This type of control can also be used with an enabling contact (CR) connected to the "Remote ON/OFF" terminal.

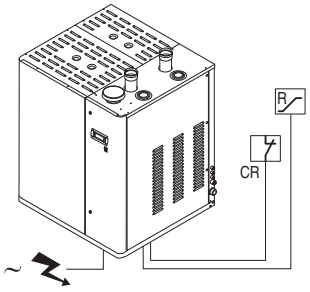


Fig. 2.c

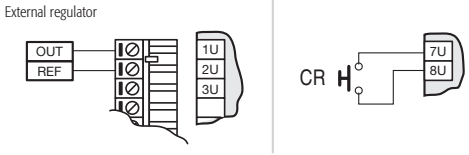


Fig. 2.d

c) Type H control:

humidity control with room probe (and outlet limit probe, if required).

With this configuration (see Fig. 2.e) the main control board, connected to a humidity probe HT, performs a complete control action according to the humidity measured.

An outlet humidity limit probe (see Fig. 2.f) can also be connected: with this configuration, the main control board, connected to a humidity probe HT, performs a complete control action, while also limiting the steam production according to the relative humidity value in the outlet duct, measured by the probe CH.

The diagrams shown in Fig. 2.g indicate the connection to be made using CAREL probes, with:

- just one relative humidity probe (a);
- an outlet humidity limit probe (b).

CAREL PROBES AVAILABLE

rooms	air ducts	industrial applications
DPWC111000	DPDC110000	DPPC210000
	DPDC210000	DPPC110000

Tab. 2.a

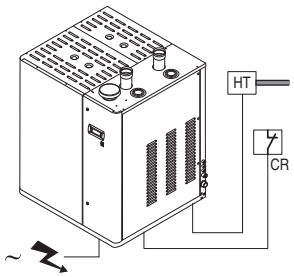


Fig.2.e

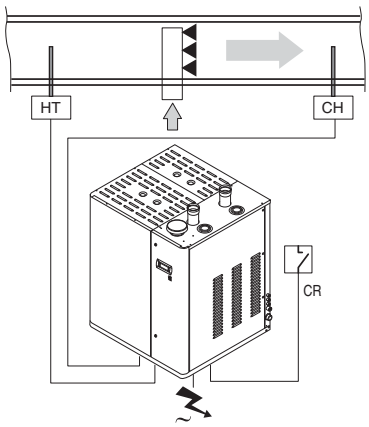


Fig.2.f

The controller can also be connected to non-CAREL probes (see par. 2.3.).

HT: CAREL relative humidity probe;
CH: CAREL outlet relative humidity probe.

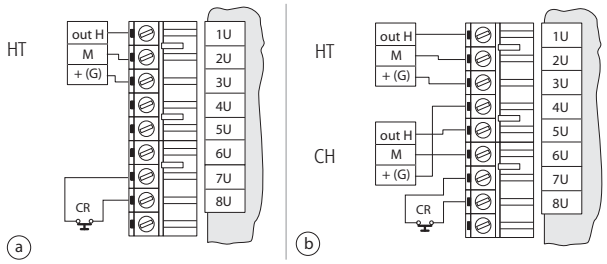


Fig. 2.g

d) Control for steam baths:
Temperature control with room temperature probe
Temperature control with room temperature probe
The humidifier is connected to a temperature probe TT (see Fig. 2.h), and performs a complete control action according to the temperature measured inside the controlled environment.
Fig. 2.i shows the connection of the CAREL probe model ASET03001, with a range of measurement -30T90°C. The recommended CAREL probes have a 0 to 1 Volt output, and therefore the range of reading must be set (see par. 4.4.4). The control signal must be connected to 1U, and the earth reference is GND (2U).
The controller can also be connected to non-CAREL active probes (see par. 2.3).

TT: CAREL temperature probe.

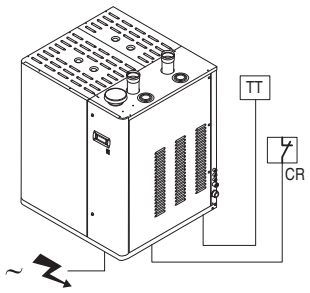


Fig. 2.h

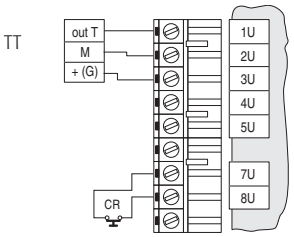


Fig.2.i

2.2 Pin strip position on the board for probe configuration

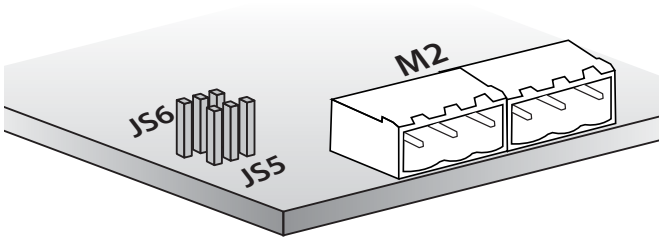


Fig. 2.l

pin strip	configuration	position	
		0 to 10 Vdc 2 to 10Vdc	0 to 1 Vdc, 4 to 20/0 to 20 mA, NTC probes
JS5	main probe	basic configuration	
JS6	limit probe	basic configuration	

2.3 Using other brand probes

Different brand probes can also be used, with the output signals, selectable from the following standards:
- voltage: 0 to 1 Vdc, 0 to 10 Vdc, 2 to 10 Vdc;
- current: 4 to 20/0 to 20 mA.

In addition, the minimum and maximum values of the signal must be set (see par. 4.4.4).

A 15 Vdc power supply is available for the probes, terminal 3U e 4U.

The control signals must be connected:
- for the control probe HT (or TT) to terminal 1U, the earth reference for which is GND (2U);
- for the limit probe CH to terminal 5U, the earth reference for which is GND (6U);
- for the current probe to terminal 4U, the earth reference for which is GND (6U).

Important warnings:
- To avoid unstable control, the earth of the probes or the external controllers must be connected to the earth on the appliance's controller.
- For the operation of the humidifier, the terminals corresponding to the "remote ON-OFF" signal must be connected to an enabling contact or jumpered (default solution). If these terminals are not connected, all the internal and external devices managed by the controller are disabled, with the exception of the drain pump, limited to the drain cycle due to extended inactivity (see par. 7.3).

3. AUXILIARY CONTACTS

3.1 Alarm contact

The humidifier controller is fitted with a voltage free contact for the remote alarm signal (one or more events). The alarm contact is connected via terminals 70, 80 and 90, as shown in Fig. 3.a.

electrical specifications
250 Vac; Imax: 8 A resistive 2 A inductive

Tab. 3.a

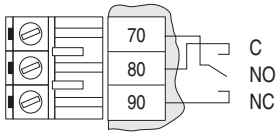


Fig. 3.a

3.2 Dehumidification contact

When the humidifier is used as in case c) in paragraph 2.1 (relative humidity control), a contact (NO, voltage-free) can be used to activate an external dehumidification device; in this case, the humidifier can provide complete control over the ambient relative humidity. The dehumidification contact is connected via terminals 13U, 14U on terminal block U, as shown in Fig. 3.b. For further details, see par. 4.4.11.

electrical specifications
250 Vac; Imax: 8 A resistive 2 A inductive

Tab. 3.b

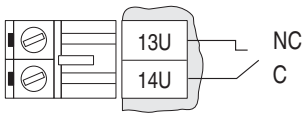


Fig. 3.b

3.3 Remote terminal

The display terminal can be detached from the humidifier and moved to another place.
Depending on the distance required, the following are necessary:

- up to 50 metres: 6-wire telephone cable and two EMC filters (code 0907858AXX) (see Fig. 5.a);
- up to 200 metres: two CAREL TCONN6J000 boards, 6-wire telephone cables and an AWG20-22 shielded cable with 3 twisted pairs (for the connection of the two boards, Fig. 5.b).

Remote connection of the terminal up to max 50 m

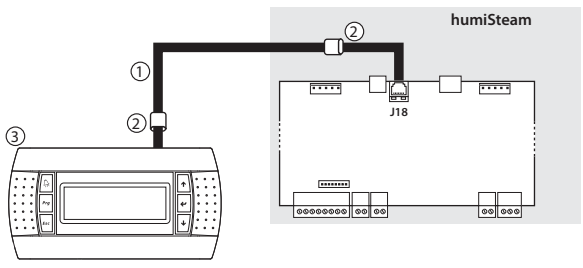


Fig. 5.a

Key:

1 telephone cable (up to 50 m distance);
2 EMC filters (code 0907858AXX) to be applied to the ends of the telephone cable;
3 remote display terminal.

Remote connection of the terminal up to 200 m

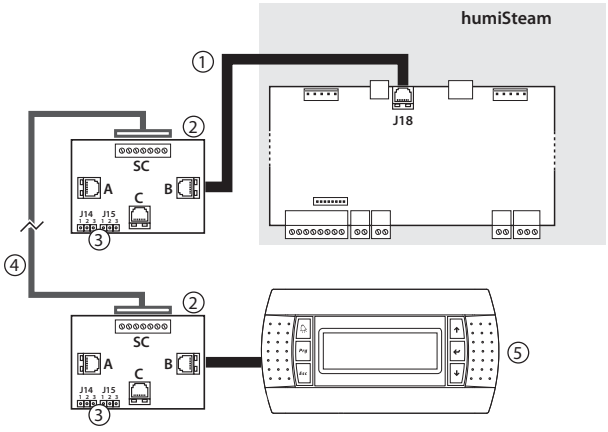


Fig. 5.b

Key:

1 telephone cable (up to 0.8 m distance);
2 CAREL TCONN6J000 board;
3 pin strip J14 and J15 in position 1-2 (power supply available on the telephone connectors A, B and C and screw SC);
4 WG20-22 shielded cable with 3 twisted pairs to move the display terminal up to 200 m away. Connection to the TCONN6J00 board:

terminal SC	function
0	EARTH (shield)
1	+VRL
2	GND
3	RX/TX-
4	RX/TX+
5	GND
6	+VRL

5 remote display terminal

3.4 GSM network connection (send SMS)

The humidifier can be configured to send SMS message for alarms and malfunctions (see menu installer > supervisor > GSM protocol).

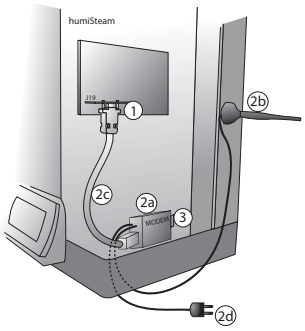


Fig. 5.c

Key:

1 electronic board PCOI00MDM0 (to be connected to connector J19 on the humidifier board)
2 • CAREL GSM kit PLW0P65M00, made up of:
  • 2.a modem
  • 2.b antenna (with magnetic base)
  • 2.c serial cable
  • 2.d power supply
3 SIM card to be inserted in the modem. Make sure that the access password (PIN number) is not enabled

3.4 Supervisory network

The controller can also be connected to a supervisory system via RS485, RS232 serial lines or FTT10 LON using the optional cards shown in the following table.

optional cards	characteristics supported	protocols
PCO1000WB0	provides BACnet 8802.3 Ethernet, BACnet/IP and MS/TP connectivity	BACnet
PCO1000BA0	Provides BACnet MS/TP over RS485	BACnet
PCO2004850	used for the direct interface of the controller to an RS485 network	CAREL, Modbus
PCO200MDM0	used for the direct interface of the controller to an RS232 network with an external modem	CAREL for remote connections
PCO20000F0	used to interface of the controller to an FTT10 LON network, when suitably programmed	LON-Echelon

Tab. 3.c

Connection is also possible to TREND systems using a card sold directly by TREND.

3.6 Checks

The following conditions represent correct electrical connection:

- the rated voltage of the appliance corresponds to the mains voltage;
- the fuses installed are suitable for the line and the power supply voltage;
- mains disconnecting switch has been installed so as to be able to disconnect power to the humidifier;
- the electrical connections have been performed as shown in the diagrams;
- the power cable is secured to the tear-proof cable clamp;
- terminals 7U-8U are jumpered or connected to an enabling contact;
- the earth of any non-CAREL probes is connected to the earth on the controller;
- if the appliance is controlled by an external controller, the earth of the signal is connected to the earth of the controller.

4. USER INTERFACE

4.1 pGD0 graphic display (CAREL code: PGD0PH0F00)

The pGD0 graphic display is an electronic device used for the complete management of the humidifier, by displaying graphic icons and alphanumeric characters.
It allows a wide range of operating temperatures (-20T60°C) and guarantees a high index of protection (IP65). The terminal is "plug&play", that is, it is automatically detected and managed by the control board.
The pGD0 graphic display (20 columns x 4 rows) is backlit.

4.1.1 Keypad

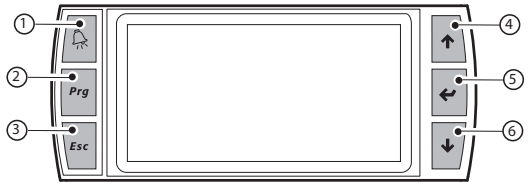


Fig. 4.a

	button	function
(1)	alarm	lists the active alarms and resets any alarms
(2)	PRG	from the "main" screen accesses the main menu
(3)	ESC	returns to the "main" screen
(4)	UP	scrolls the menus, the screens, the parameters and the values of the parameters
(5)	ENTER	accesses the individual configuration parameters
		from the "main" screen accesses "quick set"
(6)	DOWN	scrolls the menus, the screens, the parameters and the values of the parameters

Tab. 4.a

4.1.2 "Main" screen

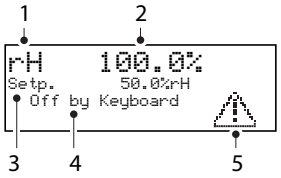


Fig. 4.b

symbol	function
(1)	indicates the selected control mode
(2)	value read according to the type of signal connected
(3)	set point value
(4)	general operating status (*)
(5)	alarm icon

Tab. 4.b

(*) Types of descriptions:

- PR,000.0 kg/h: steam production in progress (the current steam flow-rate is displayed),
- ALARM: steam production disabled by alarm,
- OFF FROM SUPERVISOR: steam production disabled by supervisor,
- OFF FROM TIME BAND: steam production disabled during pre-set time band,
- OFF FROM REMOTE: steam production stopped by opening the "Remote ON/OFF" contact,
- OFF FROM KEYPAD: steam production disabled from the keypad
- NO REQUEST: unit on without steam request.
- DISABLED: humidifier disabled from the keypad.

4.1.3 "INFO" screen (read only)

Readings of the measurements and the main parameters

The main measurements and parameters can be displayed very simply by scrolling the screens that, staring from the main screen (par. 4.1.2), are accessed by pressing the "UP" and "DOWN" buttons.
These screens contain the values listed in Tab. 4.c.

display	UOM	access	description
steam:	kg/h or lb/hr		total steam flow-rate
Set P.	%rH	in H control mode	humidity measured in the room
Amb.Hum:	%rH		ambient humidity set point
Set T.:	°C (°F)	in T control mode	room temperature
RoomT:	°C (°F)		room temperature set point
Set P. Lim.:	%rH	in H control mode+Limit	outlet set point
Humid.Limit:	%rH		outlet relative humidity
Prod.B1:	kg/h or lb/hr		current production of burner 1
Fan 1:	RPM		speed of fan 1
Prod.B2:	kg/h or lb/hr		current production of burner 2 (UG180)
Fan 2:	RPM		speed of fan 2 (UG180)
Flue gas temperature Burner 1: Burner 2:	°C (°F)		flue gas temperature
Preheat set:	°C (°F)		set preheating point (if preheating is not enabled, "N.A." is displayed)
Antifreeze set:	°C (°F)		antifreeze set point (if not enabled, "N.A." is displayed)
Conductivity	µS/cm		mains supply water conductivity

Tab. 4.c

text	option		description
gaSteam Status	see par. 4.1.2		similar to the status shown on the main screen
Burner 1 (2)	status	On	combustion active
		Off	combustion not active
		Alarm	alarm
	activation:	Off	burner not active
		Production	steam production in progress
		Preheat	preheating in progress
		Purge	purge in progress
		Antifreeze	antifreeze in progress
	Speed:		fan speed (rpm)

Tab. 4.d

4.1.4 "Quick set" screen

Press ENTER from the main screen to quickly access the for setting the set point parameters:

- in control mode ON-OFF (type C): see Fig. 4.c;
- in control mode with external controller (type P): see Fig. 4.c;
- in control mode with humidity probe (type H): see Fig.4.d;
- in control mode with temperature probe (type T): Fig. 4.e.

To change the value of a parameter, highlight it by pressing Enter and use the arrows to change the value.

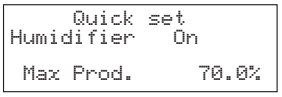


Fig. 4.c

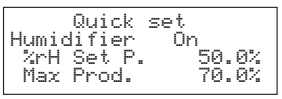


Fig. 4.d

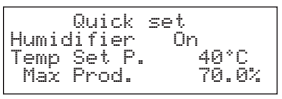


Fig. 4.e

4.2 Main menu

To access this menu, press PRG button from the main screen. Buttons:

• UP and DOWN: scroll inside the submenus, change the range of values and settings;

• ENTER: scroll inside the screens and confirm the changes made;

• ESC to go back (pressed more than once returns to the main screen).

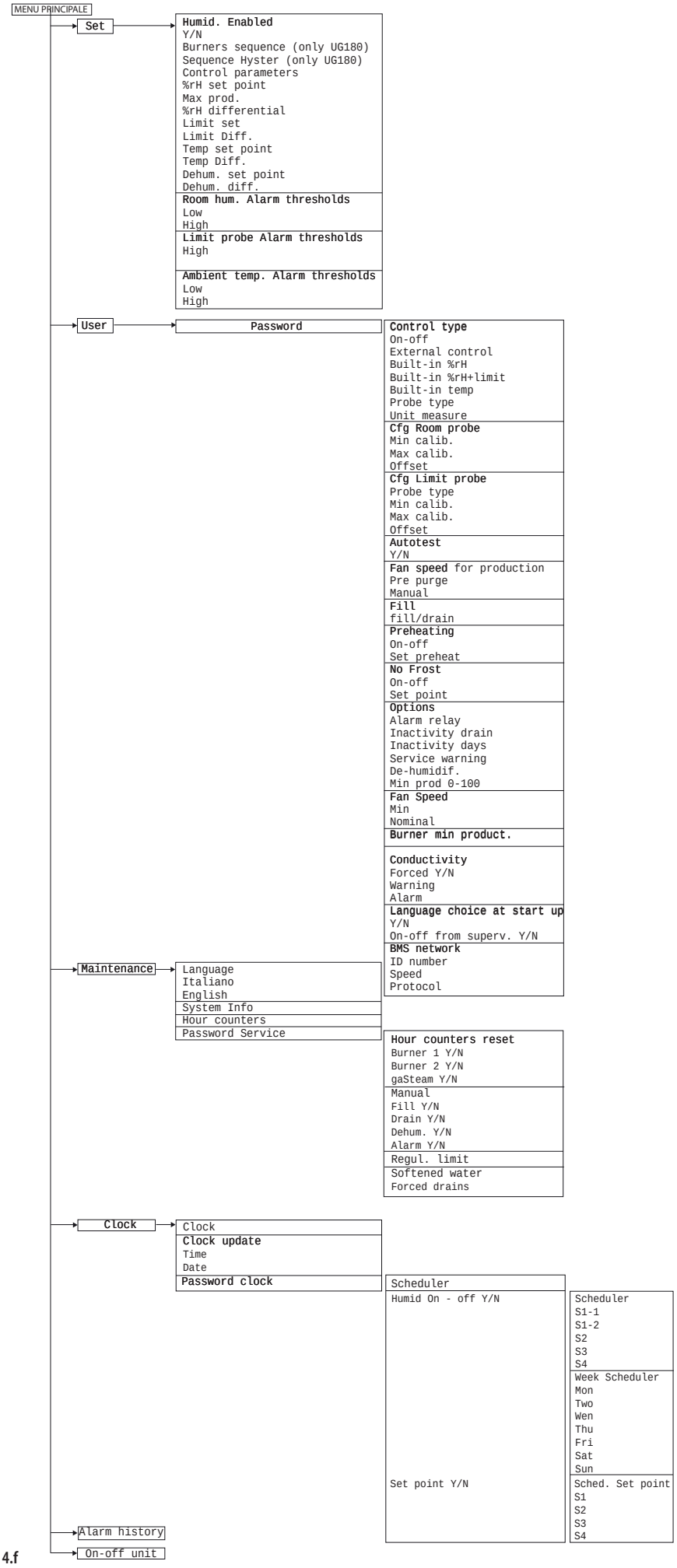


Fig. 4.f

4.3 "Set" submenu

This submenu is used to access the screens for enabling the steam production unit and setting the control parameters.

4.3.1 Enable operation - start/stop steam production

Once the unit has been switched on from the keypad (see Par. 4.8), the "enable" function effectively starts the humidifier. Subsequently, steam production is related solely to the humidity request or the presence of an alarm or a remote OFF signal.
If the humidifier is not enabled for operation, the main screen appears as shown in Fig. 4.g.

Fig. 4.g

- Enabling operation:

1. Select the MENU
   - Press "PRG". The "Menu" screen is displayed, select "Set" and press ENTER;
2. Start the Unit
   - Press "Enter" to move the curso to "Humidif. Enabled";
   - Press "UP" or "DOWN" to change the value.
   - Press "ENTER" to confirm. The screen shown in Fig. 4.h is displayed. Note that in the main screen the term "Disabled" no longer appears, Fig. 4.v.g.

*: the "Burners Sequence" row is only shown on the UG180.

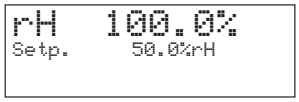


Fig. 4.h

At this stage, the humidifier has been enabled and started from the keypad and is ready to produce steam.
Note: lthe production of steam now depends only on the control parameters selected (see par. 4.3.4) and the signal applied (humidity or temperature probe or signal from external controller).

- Disabling operation

Similarly to the previous paragraph, the operation of the humidifier can be stopped, disabling the unit. The sequence is the same, but rather set the "Humidif. enabled" variable to "NO".

4.3.2 Reading and setting the set point

The main screen shows the value of the set point, in the field to the right of "Set P."

control mode	display in the field to the right of "Setp."
Type H	ambient humidity set point
Type T	temperature set point

Tab. 4.e

Setting the ambient humidity set point

Sequence:
- go to the main screen and press "PRG";
- access the "SET" submenu;
- scroll the screens until reaching the one indicated (Fig. 4.i);

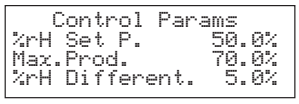


Fig. 4.i

- press "ENTER" to move the cursor to the field to the right of "rH Set P.";
- press "UP" or "DOWN" to change the value;
- press "ENTER" to confirm.

Characteristics and limits of the set point:

	unit of measure	default value (1)	min. limit	max. limit
humidity control (H control)	% rH	50.0	0.0	100.0

Tab. 4.f

Warning: the outlet humidity set point, relating to the limit probe, is saved with the parameter "Limit Set" (see par. 4.3.4).

Setting the temperature set point

This operation is only possible if T control mode has been activated.
Sequence:
- go to the main screen and press "PRG":
- press "ENTER" to move the cursor to the field to the right of "Temp Set.";
- press "UP" & "DOWN" to change the value;
- press "ENTER" to confirm.

Setting the outlet humidity set point

This operation is only possible if H control mode with outlet limit has been activated (see the paragraph "Setting the control mode", par. 4.3.4).
Sequence:
- go to the main screen and press "PRG";
- access the "SET" submenu;
- scroll the screens until reaching the one indicated here;
- press "ENTER" to move the cursor to the right of "Limit set";
- press "UP" & "DOWN" to change the value;
- press "ENTER" to confirm.

4.3.3 Modifying the maximum production allowed

The maximum production allowed can be modified in all control modes.

1. Select MENU: press "PRG". The "Menu" screen is displayed; select "Set" and press "ENTER";
2. Access and modify the control parameters: use "UP" or "DOWN" to go to the "Control Params." screen (Fig. 4.l);

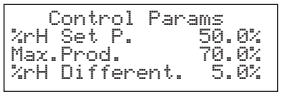


Fig. 4.l

- using the "ENTER" button, move to the field to be modified, Fig. 4.m.

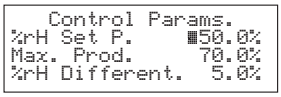


Fig. 4.m

- use "UP" & "DOWN" to change the value and press "ENTER" to confirm, Fig. 4.n.

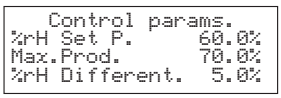


Fig. 4.n

4.3.4 Setting the control parameters

The control parameters are the values corresponding to the ambient humidity control (or temperature) control process. To access these parameters, scroll the screens under the "SET" submenu. The procedure for setting these parameters is similar to the one described for setting the maximum production (Par. 4.3.3).

Control parameters

Sc..	display	range		default	UOM	access	description
Control parameters	Burner sequence UG180 only	Parallel,		Parallel		always	Operating mode (see Chap. 9 Operating principles)
		Series					
	Seq. hyster.: UG180 only	0 to 20.0		5.0	%	always	Hysteresis for stopping/igniting the burners only in series or parallel burner sequence with rotation (see "Setting the operating sequence of the two burners") UG180
	Max.prod.	25.0 to 100.0	if UG045/90 & UG180 if sequence"= parallel & rotation not active	70.0	%	always	Maximum production of the humidifier as a percentageFor the concept of rotation see par. 6.3 "Options"Note: for the minimum limit for this parameter - see par. 5.17 "Setting production"
		12.5 to 100.0	UG180 only if "boiler sequence"= series				
	%rH Set P.	0 to 100.0		50	%	In H control mode and H control mode with outlet limit	Humidity set point
	%rH Differential	2.0 to 20.0		5.0	%		
	Limit Set	(%rH set point) to 100.0		80.0	%	only in H control mode with outlet limit	Outlet humidity set point
	L. Diff.	2.0 to 20.0		5.0	%		Outlet humidity differential
	Temp Set	0 to 50.0		30.0	°C	Only in T control mode	Temperature set point
		32.0 to 122.0		86.0	°F		
	Temp Diff.	2.0 to 19.9		5.0	°C		Temperature differential
		35.6 to 68		41.0	°F		
Alarm threshold	Low (Room hum.)	0 to 100.0		10.0	%	In H control mode and H control mode with outlet limit	Low humidity alarm threshold
	High (Room hum.)	0 to 100.0		90.0	%		High humidity alarm threshold
	High (Limit)	0 to 100.0		100.0	%rH	only H control mode with outlet limit	High outlet humidity alarm threshold
	Low (Temp.)	0 to (high threshold)		0	°C	only in T control mode	Low temperature alarm threshold
		32.0 to (high threshold)		32.0	°F		
	High (Temp.)	(low threshold) to 60.0		60.0	°C		High ambient temperature alarm threshold
		(low threshold) to 140.0		140.0	°F		

Tab. 4.g

4.3.5 Setting the "operating sequence of the two burners" (UG180 only)

The gaSteam 180 manages the operation of the two burners so that in steady operation these produce 180 kg/h of steam.
Ideally, the gaSteam 180 can be considered as two separate humidifiers, each with its own burner, and able to produce up to 90 kg/h.
The two systems are managed based on the setting of the "Burner Sequence" parameter, seen in the previous table.

- "PARALLEL" mode: the steam request is divided equally between the burners. In this case, therefore, the steam production provided by the two burners is the same.
- "Series" mode (also called "sequential"): if the steam request is less than 50% of the rated production, only one burner is operated. Only if the request exceeds the 50 % does the other burner start.

As each burner must operate so that the corresponding "ideal" humidifier produces a minimum of 25% (for natural gas; 33% for butane-propane) of the "ideal" flow-rate of 90 kg/h, "Series" mode naturally offers a wider overall range of modulation of steam production.

- PARALLEL mode: the minimum possible production is 45 kg/h;
- Series mode: the minimum production is 22.5 kg/h

Key

1	production burner 1; total
2	total request
3	production burner 2; total
4	2% in P control; 0.1xP0 in H/T control
5	total production

Example of PARALLEL mode

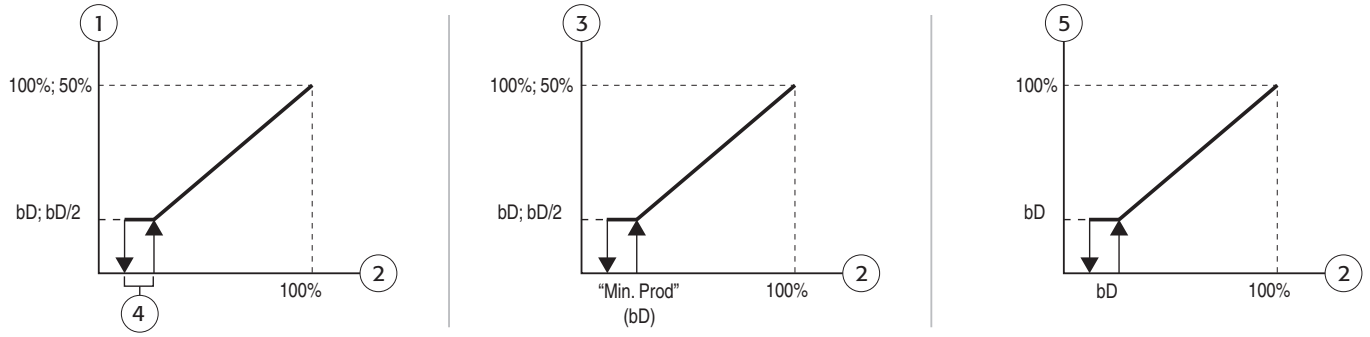
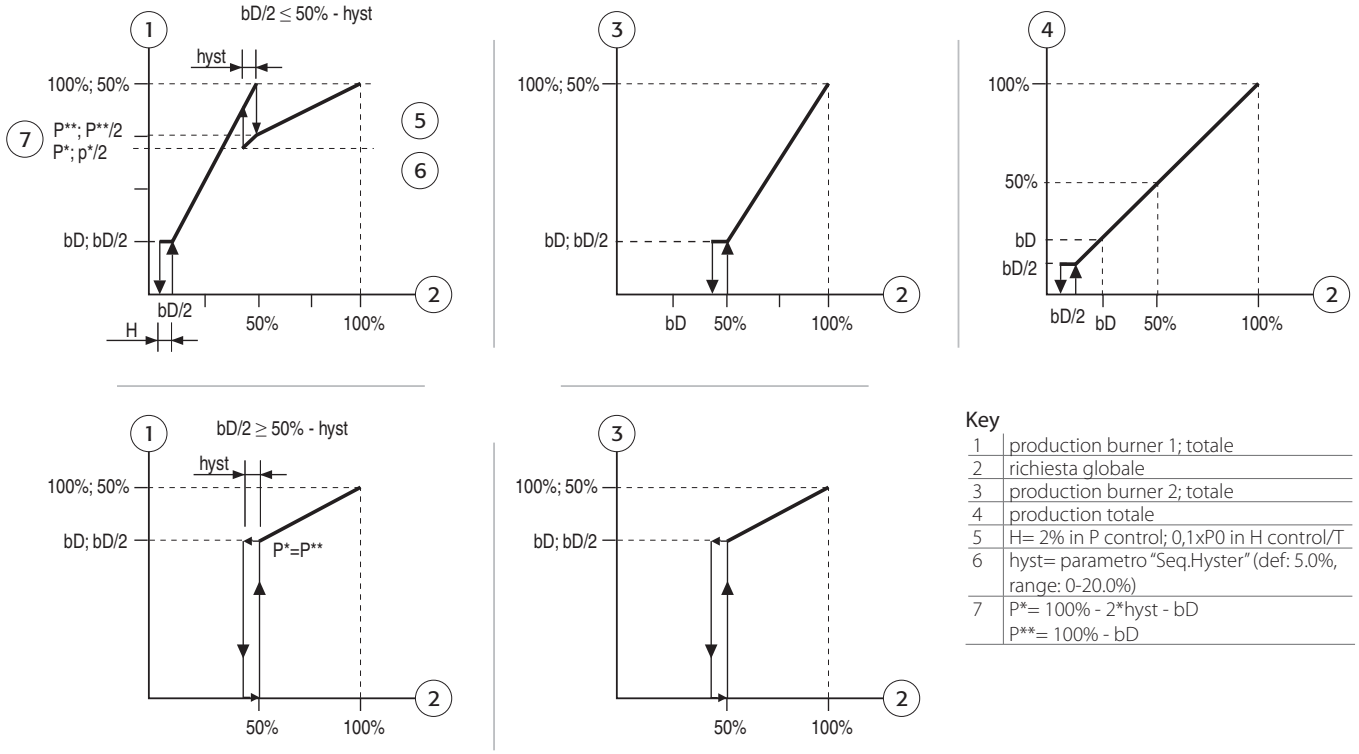


Fig. 4.o

Example of Series mode



Key

1	production burner 1; totale
2	richiesta globale
3	production burner 2; totale
4	production totale
5	H= 2% in P control; 0,1xP0 in H control/T
6	hyst= parametro "Seq.Hyster" (def: 5.0%, range: 0-20.0%)
7	P*= 100% - 2*hyst - bD P**= 100% - bD

Fig. 4.p

It can be seen that an hysteresis is required in the intermediate burner On/Off zone, which is managed by the "Seq. Hyster." parameter seen in the previous table. To offer a wider range of modulation in parallel mode, the concept of "ROTATION" has been introduced (see OPTIONS - Rotation of the request between the burners).
If ROTATION is active, in PARALLEL mode too one burner is started first, while the other remains off until the steam request is between 12.5% and 25%. Above 25%, both burners start operating in parallel mode..

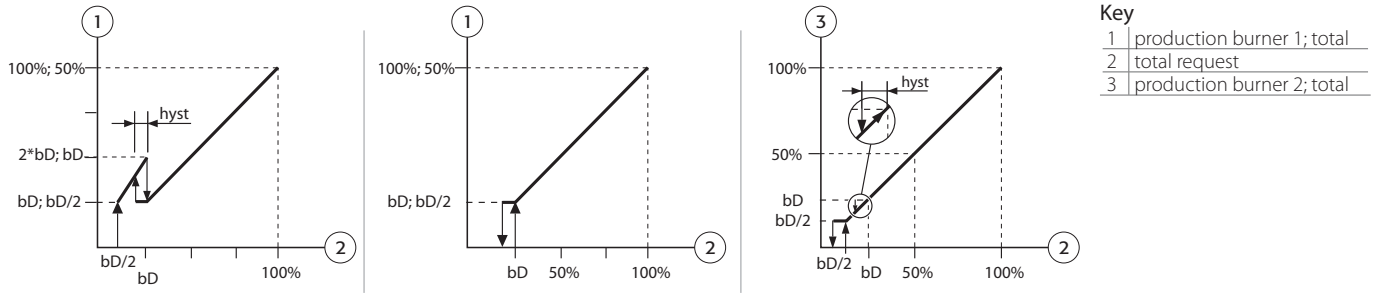


Fig. 4.q

burners (UG180 only)

parameter name	options	default
Burner rotation	NO ROTAZIONE	No Rotation
	AT START	
	IN PRODUCTION	

Tab. 4.h

Description
In normal operation, depending on the humidity request and the control mode selected (series or parallel), the control logic automatically calculates how much energy must be generated by each burner/fan system.
The rotation of the request consists in periodically reversing these production references.
The rotation of the request ensures, in the long term, similar operating hours for the two burners in the gaSteam, with the consequence of not only having more uniform wear on the combustion systems, but also a more uniform accumulation of lime-scale deposits on the two exchangers.

Two types of rotation are available:
- IN PRODUCTION: this is rotation by time, that is, whenever the difference in operating hours between the two burners reaches 10 hours, the production references are reversed.
- AT START: whenever that the steam production ends, when following request is received, the burner with the less operating hours always starts first, along as the difference in operating hours has exceeded 10 h.

Note: the difference of 10 h can be modified. The parameter is called "Time Diff." and is displayed on the same screen as the "Burner rotation" only if one of the two rotation modes is enabled.

4.4 Reading and setting the configuration parameters - "USER" submenu

The configuration parameters are used to set the operating modes of the controller, that is, assign the essential functions of the humidifier. These parameters are normally managed by the installer or the service personnel, and therefore a password is required to access the screens that contain these parameters.
To access these screens, the sequence is:
- press "PRG";
- access the "USER" submenu;
- when the "User Password" is requested, enter the number "77".

To change the parameters in the same screen, proceed as follows:
- press "ENTER" to to position the cursor on the desired parameter;
- press "UP" or "DOWN" to change the value;
- press "ENTER" to confirm and access the next parameter.

The type and meaning of these parameters are listed in the following paragraphs.

4.4.1 Configuring the control mode

This parameter can be used to choose between 5 different control modes, listed in the table below.

parameter name	display	description (for a detailed description see par. 7.2)	
Type of control	H: %rH probe	H control (default)	Humidity control with room probe
	H: %rH probe + Limit	H control	Humidity control with room probe and limit probe
	P: Ext. control	P control	Proportional control with signal set by external controller
	T: Temp. control	T control	Temperature control with room probe
	C:ON/OFF	C control	Humidity control with humidistat

Tab. 4.i

4.4.2 Selecting the type of probe

This is used to set the type of probe or the type of signal sent.

parameter name	display
Probe type	0 to 1 V
(not accessible in C control mode: ON/OFF)	0 to 10 V (default)
	2 to 10 V
	0 to 20 mA
	4 to 20 mA
	NTC
	0 to 135 ohm

Tab. 4.l

4.4.3 Unit of measure

Select the unit of measure, between metric and imperial.

parameter name	display
Unit of measure	°C-kg/h (default)
	°F - lb/hr

Tab. 4.m

4.4.4 Configuring the room humidity (or temperature) probe

This is used to set the minimum value, maximum value and the offset for the probe used in the room.

screen name	parameter name	range	default	access	UOM	
					H control	T control
Config. Room Probe (not accessible in C control mode: ON/OFF)	Min.	0 to (Max.)	0.0		%rH	°C
	Max.	(Min) to 100	100.0		%rH	°C
	Offset	-10.0 to 10.0	0.0		%rH	°C (o °F)

Tab. 4.n

NOTE for T control: the setting of the minimum and the maximum values for the probe is only in degrees centigrade.
The offset, on the other hand, being linked to the difference between the reading made by the probe and by a reference thermometer, depends on which unit of measure has been selected.
For example, if having selected imperial measurements: if based on the measurements made it is clear that the value read by the probe is normally 2°F higher than the reading made by a reference thermometer, to correct the error set the offset to -2.0 °F).

4.4.5 Configuring the limit humidity probe

This is used to set the minimum value, maximum value and the offset for the limit probe.

screen name	parameter name	range	default	UOM
Config. Limit Probe (accessible only in H control mode with outlet limit)	Type	0 to 1 V	0 to 10 V	
		0 to 10 V, 2 to 10 V, 0 to 20 mA, 4 to 20 mA, NTC		
	Min.	0 to (Max.)	0.0	%rH
	Max.	(Min) to 255	100.0	%rH
	Offset	-10.0 to 10.0	0.0	%rH

Tab. 4.o

4.4.6 Initial autotest

This is an automatic procedure used to check the correct status of the fill valve and the drain pump and the level sensor system.
The procedure is as follows:
- the boiler is filled until reaching the highest point of the level sensor
- a drain cycle is performed until reaching the lowest point of the level sensor.

All this takes place without igniting the burners.
To enable/disable the auto-test procedure, go to the "USER" submenu, enter the password "77" and go to the screen shown in Fig. 4.r.
Move the cursor to "Autotest" and use the UP/DOWN arrows to set "YES" or "NO". The default value is "YES".

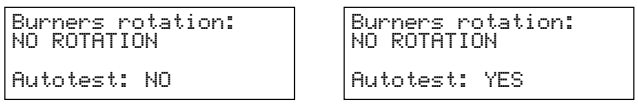


Fig. 4.r

NOTE: The autotest is only performed if the humidifier is enabled for production, "Humid. Enabled=Yes" and if the controller is enabled from the keypad This function is useful for service or when first starting the appliance.

IMPORTANT: In these conditions, the autotest occurs whenever the controller is switched off an on again.

4.4.7 Setting the pre-purge speed and manual procedure for flue gas calibration

NOTE: These operations must be carried out by qualified personnel.

The pre-purge speed is indicated in "RPM" and is normally set by the manufacturer based on the characteristics of the combustion system and the gas.
To modify this parameter, go to the screen (Fig. 4.s) and change the "Pre-purge" parameter.

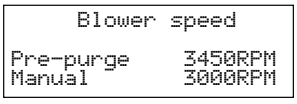


Fig. 4.s

During service, it may also be useful to check if the fan speed measured with a stroboscope coincides with the speed set via SW. The "Manual" parameter can be used to force a desired speed for performing the test.

4.4.8 Setting the maximum ratio between the water filled and the water drained for dilution

During normal operation, the gaSteam periodically performs drain cycles, called drain "for dilution", followed by refilling with supply water. These drain cycles have the fundamental task of reducing the high conductivity of the water inside the boiler due to the continuous concentration of salts during the repeated fill/evaporation cycles.
The control logic calculates how many fill/evaporation cycles must be completed before performing the dilution, based on the conductivity of the supply water. Normally, if the supply water is not very conductive, the drain cycles for dilution are performed less frequently. With this type of water, therefore, the number of fills between two successive drain cycles for dilution can be very high.

4.4.9 Preheating

The preheating function is used to keep the water above a temperature set by the user when no steam is requested. Preheating thus speeds up the return to steam production when next requested.

There are three options:
1. preheating disabled;
2. preheating enabled: operation by temperature + restriction on %rH .

In classic mode, preheating is controlled depending on the water temperature and is activated according to the value read by the humidity (in H control) or temperature probes (in T control) or the signal applied (in P control).

This is enabled by setting "TEMP. + %rH" for the preheating options present in the screen shown in Fig. 4.t.

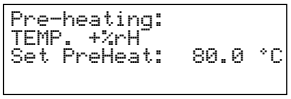


Fig. 4.t

Preheating is activated depending on the humidity value measured by the probe and by the operating mode set.
In C mode (ON/OFF), preheating is never activated.
In P mode (proportional), preheating is activated and deactivated depending on the signal applied to the room probe input.
By default, preheating is activated when the signal applied exceeds 3%, while it is deactivated when it falls below 1% (see Fig. 4.u).
In humidity control mode preheating is activated when the relative humidity falls below the "humidity set point + preheating offset - hysteresis" and is deactivated when it rises above the "humidity set point + preheating offset" (see Fig. 4.u).

The values of the preheating offset and hysteresis parameters can be changed from the default values.
These must be as follows:

Preheating offset:	Range= 2.0 - 20.0 [°C] ;	Default= 3.0 [°C]
Hysteresis:	Range= 2.0 - 5.0 [°C] ;	Default= 2.0 [°C]

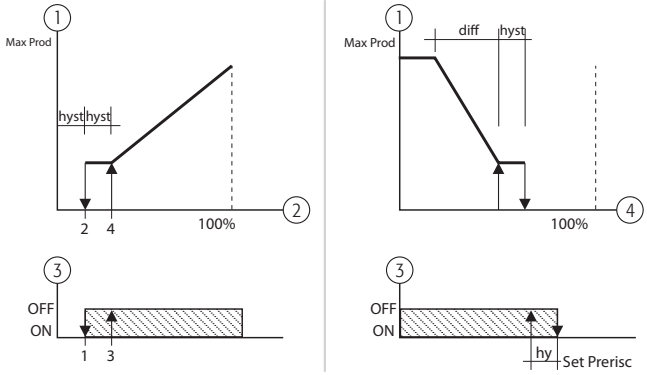


Fig. 4.u

Key

1	production %
2	signal applied to probe 1 input
3	preheating
4	probe rH1

Once preheating is activated, the heating is modulated by the systems (burners + fans) depending on the water temperature measured by the NTC probe and the "preheating set point" (see Fig. 4.v).
The preheating set point temperature must be a parameter with a range 70T-90°C and a default equal to 80 °C.

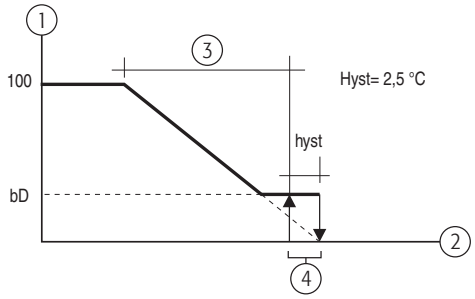


Fig. 4.v

Key

1	reference % for the burner
2	temperature
3	fixed differential of 20°C
4	preheating temperature (def.: 80°C)

3) Preheating enabled: operation with temperature control only
In this case, preheating is always enabled, that is, it is not activated depending on the humidity value or the temperature measured by the external probe.
The reference for the combustion systems only depends on the water temperature measured by the NTC probe and by the preheating set point, as illustrated in the previous graph.
This option is enabled by choosing the "TEMPERATURE ONLY" option in the previous screen (Fig. 4.u).

4.4.10 Antifreeze

The antifreeze option can be very useful in applications that feature the installation of the gaSteam outdoors, especially in colder countries where there is the real risk that, if no steam is requested, the water inside the boiler might freeze.
For this reason, an option has been added that starts heating the water if the temperature measured by the NTC probe is too low.
The humidifier must be activated and continuously connected to the power and gas supplies, excluding any interruptions.
The antifreeze function acts as displayed in the following graph (Fig. 4.z).

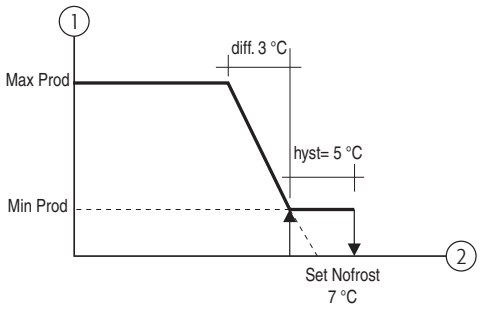


Fig. 4.z

Key

1	reference % for the burner
2	NTC temperature

.4.11 Options

Reversing the logic of the alarm relay
Normally, the alarms that stop the humidifier close the alarm relay contact.
This logic can be reversed, so that the coil remains energised when no alarm is present, and the contact is open when an alarm is activated.

To do this, set the following parameter:

screen name	parameter name	range	default
Options	Al. relay	ENERGISED	ENERGISED
		NOT ENERGISED	

Tab. 4.p

Drain due to inactivity
The drain due to inactivity option is used to completely empty the water from the cylinder if the cylinder does not produce steam for a period set by parameter, which by default is 3 days.
By default, drain due to inactivity is enabled.
It can be disabled by setting the parameter in the following table:

screen name	parameter name	range	default
Options	Drain for inactivity.	Y,N	Y

In addition, the value of the parameter relating to the period of inactivity can be changed, available by scrolling the screens. The parameter is:

screen name	parameter name	range	default	UOM
Options	Days of inactivity	1 to 199	3	d (days)

Warn when exceeding maintenance hour limit

The gaSteam features a limit to the number of operating hours of the humidifier, beyond which it is recommended to perform maintenance (see the par. on MAINTENANCE). In this case, a "maintenance request" alarm is sent. Nonetheless, this alarm can be disabled, by setting the "Maint. warning" parameter to "N".

screen name	range	default	UOM
Maint. warning	Y, N	Y	h (hours)

Dehumidification

The dehumidification function is only possible if terminals 13U - 14U on terminal block U are connected electrically to a dehumidifier (see par. 3.2).

By default, dehumidification is not enabled.

During normal operation, dehumidification may occur only if the following conditions are satisfied:

1. the dehumidification option is enabled;
2. the ambient humidity probe is connected;
3. the humidifier has not been disabled by "Remote ON/OFF";

If these conditions are satisfied, the dehumidification process is activated depending on the humidity measured, based on the "dehumidification set point" and "dehumidification differential" parameters, as shown in the graph (Fig. 4.a.a)

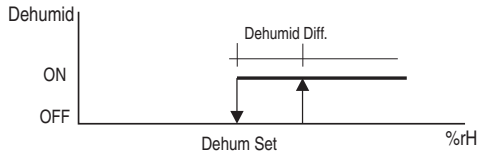


Fig. 4.a.a

To activate the dehumidification function, the following parameter needs to be enabled:

screen name	parameter name	range	default
Options	Dehumidify	Y, N	N

Once dehumidification has been enabled, the "set point" and "differential" parameters can be modified.

To do this, go to the following screen (Fig. 4.a.b), under the "SET" submenu.

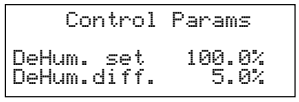


Fig. 4.a.b

The characteristics of these parameters are listed below:

screen name	parameter name	range	default	UOM
Control Param.	Dehumid.set	(humdity set point) to 100.0	100.0	%
	Dehumid.diff.	2.0 to 19.9	5.0	%

Setting the production ramp

During operation, the steam request may change depending on the readings of the probes or the signal from the external controller.

The speed at which the humidifier shifts to the new request can be slowed down by setting the parameter (formerly parameter b9 in the old gaSteam models 40, 45, 90) that is found in the screen shown (Fig. 4.a.c).

- parameter set to zero: the control logic uses an internal ramp (30 s) to shift from one request to the next;
- parameter set to a value other than 0: the logic recalculates the fan speed variation step, based on the assumption that to change from 0 to 100% of production must take the time set for this parameter.

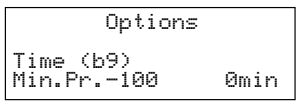


Fig. 4.a.c

Setting the fan speed for minimum and rated production

These values are set by default to ensure the correct air/gas mix with natural gas. They are found on the screen shown below (Fig. 4.a.d).

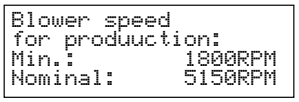


Fig. 4.a.d

Setting the minimum production

The minimum production as a % guaranteed by each burner depends on the type of gas used. Normally, its value is 25% for natural gas, and 33% for butane and propane. The reference screen is the following (Fig. a.e).

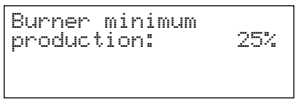


Fig. 4.a.e

Manually setting the conductivity of the supply water and setting the conductivity alarm thresholds

The conductivity of the supply water, as well as normally being monitored to prevent excessively conductive water from entering ("High conductivity alarms" - see "Alarms"), is also useful for determining the limit of fill/evaporation cycles between two drain cycles for dilution.

A water conductivity value different from the reading of the conductivity meter can be set, by changing parameter "B4" on the "conductivity" screen. The default value "0" indicates that the value used is the reading made by the conductivity meter. Any value ≠ "0" indirectly affects the maximum number of evaporation cycles between two drain to dilute cycles: the lower the conductivity setting, the higher the maximum number of cycles.

The limit values for the high conductivity warning and alarm can also be set on the same screen.

The screen has the following characteristics:

screen name	parameter name	range	default	UOM
Conductivity	Forced (B4)	0 to 2000 (*)	0	uS/cm
	Pre-Al (B5)	0 - (B6)	1000	uS/cm
	Alarm (B6)	(B5)-2000	1250	uS/cm

(*): supply water conductivity:

- b4= 0: the controller uses the conductivity measured automatically by the conductivity meter;
- b4= 1 to 4: the value set corresponds to the number of evaporation cycles between two drain for dilution cycles: each "b4" evaporation cycles one drain to dilute cycle is performed;
- b4> 4: the controller uses the value of b4 as the conductivity and IGNORES the value measured by the conductivity meter.

Note: to the side of the above parameters there may be the codes B4, B5 and B6, which indicate the name of the parameter that was normally used with the gaSteam 40, 45 and 90.

Important: it is possible, when the "treated water " mode is disableb - see par. 5.1.1.

Disabling the change language screen

During the start-up sequence (see par. 5.1), the screen that is used to change the language normally appears for 30 seconds. To deactivate this screen:

- go to the screen shown below (Fig. 4.a.f);
- set the value to the right of "Language choice at start-up" to "N";
- press "ENTER" to confirm.

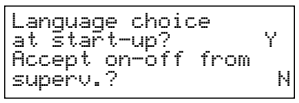


Fig. 4.a.f

Enabling remote off via supervisor

In the same screen seen in the previous paragraph, humidifier on/off via supervisor can also be enabled.

To do this, simply set "Y" to the right of the question "Accept on-off from superv.?") - (Fig. 4.a.f).

Configuring the communication protocols

By accessing the screen containing the parameters shown in the table, the controller can be configured so as to be able to communicate correctly using different communication protocols.

The parameters in question are listed in the following table:

parameter name	range	default	UOM
ID number for BMS Network	0 to 200	1	
Comm. speed	1200, 2400, 4800, 9600, 19200	19200	Bps
Protocol	CAREL, Modbus, LON, RS232, GSM	CAREL	

4.5 "Service" submenu

By entering the "service" submenu, the installer or service personnel can access information and perform any required operations.

4.5.1 Setting the language

The language can be set to English or Italian.

The sequence is listed below:

a. Press "PRG". The "Menu" screen is displayed;
b. Using the "DOWN" button, move to the "service" field;
c. Press "ENTER", Fig. 4.v.r;
d. Press "ENTER" to move the cursor to the language field and change the setting using "UP" or "DOWN";
e. Press "ENTER" to confirm.

The language can also be set during the "start-up sequence": in fact, when the following screen appears, the language can be set by simply pressing one of the two "UP" or "DOWN" arrows, and then pressing the "ENTER" button to save the change.

NOTE: the default language is English.

4.5.2 Information on the firmware

The second screen in the "service" submenu indicates the code and the version of the application installed.

The third screen corresponds to "System info", that is, the BIOS and BOOT versions installed (Fig. 4.a.g).

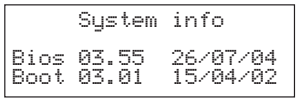


Fig. 4.a.g

4.5.3 "SERVICE" - display the operating hours

This screen indicates the total operating hours, and the operating hours of each individual burner (Fig. 4.a.h).

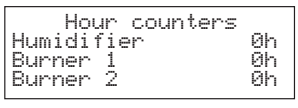


Fig. 4.a.h

NOTE: The operating hours displayed are proportional to production. For example, if burner 1 has operated for 100 hours at 100%, the value displayed will be 100 h, On the other hand, if burner 1 has operated for 100 hours at 70 %, 70 h will be displayed.

Operations with password access

The following operations must only be carried out by installation or service personnel.

Access is only possible on entering the password "77" in the screen shown below (Fig. 4.a.i).

Fig. 4.a.i

To enter the password, simply:

- press "ENTER" to move the cursor to the field with the "0";
- press "UP" or "DOWN" to enter the number "77";
- press "ENTER" to confirm.

- Reset the operating hours

Password access only.

The operating hours of the burner should be reset whenever the boiler is cleaned or the exchanger replaced.

On the other hand, it is not recommended to reset the total operating hours of the humidifier, as it may be useful to know how many hours the humidifier has been working for.

Resetting the total hour counter may be useful if completely replacing the combustion system (exchangers, burners).

The operating hours can be reset from inside the following screen (Fig. 4.a.l).

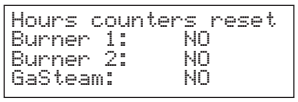


Fig. 4.a.l

To reset the hours:

- press "ENTER" to move the cursor to the field in question;
- change the value using "UP" or "DOWN";
- press "ENTER" to confirm and move to the next field.

4.5.4 Procedure for testing the electrical parts

Password access only.

This procedure allows the manufacturer, the installer or the service personnel to check the correct connections between the electrical components, that is, to check:

- the activation of the fans/burners;
- the opening of the water fill valve;
- the activation of the drain pump;
- the activation of the dehumidification contact;
- the activation of the alarm relays.

To access the test screens, the humidifier must be disabled (Humid. enabled: NO) and then activated from the keypad (ON).

The sequence is as follows:

1. press PRG;
2. access the "service" submenu;
3. scroll the screens until reaching "Service Password";
4. enter la password "77" to accedere alle screens successive;
5. scroll the screens until reaching the enable manual procedure screen;
6. enable the manual procedures, setting the "Manual" field to "Y". Once the screen has been enabled, the fields relating to the outputs will be active, Fig. 4.a.m;
7. to activate the outputs simply move to the desired output and change the value with the "UP" and "DOWN" buttons, Fig. 4.a.n;
8. note that by enabling the manual procedures, the following screen can be accessed to activate the burners/fans, Fig. 4.a.o;

9. to enable burner/fan 1, move to the "Burn.1" field and set it to "Y". Once having done this, two other fields will be displayed, which indicate the request as a % and the fan speed in RPM, Fig. 4.a.p;
10. to switch on burner 1, simply move to the "Req" field and set it to any value other than zero. In this way, both the Honeywell board for burner 1 and fan 1 will be powered;
11. the same is true for burner/fan 2 (UG180 only), however to move to the "Burn.2" field, Fig. 4.a.q.

Once the outputs have been tested, exit the manual procedure by either setting the "Manual" variable to "N" on the screen seen in point 5, or alternatively by simply switching the unit off using the keypad.

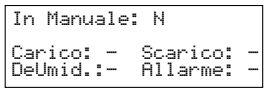


Fig. 4.am

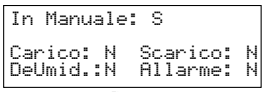


Fig. 4.an

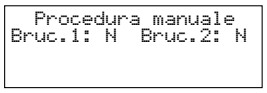


Fig. 4.ao

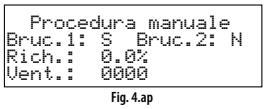


Fig. 4.ap

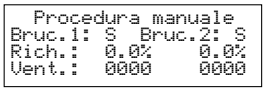


Fig. 4.ar

4.6 "Clock" submenu

Entering the "clock" submenu, the user can set the time and date (useful for the timed start-up of the humidifier), Fig. 4.a.r.

Fig. 4.a.r

Setting the clock

The clock can be set using the "UP" and "DOWN" buttons in the following screen, Fig. 4.a.s.

Fig. 4.a.s

To set the clock:
- press "ENTER" to move the cursor to the desired field;
- change the value using "UP" & "DOWN";
- press "ENTER" to confirm.

Setting the time bands

This important function is used to automatically set the operation of the humidifier during the days of the week. These settings are accessed after entering the password "0077" (Fig. 4.a.t), which opens the time band activation screen (Fig. 4.a.u).

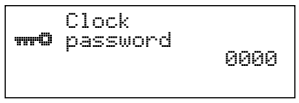


Fig. 4.a.t

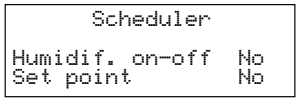


Fig. 4.a.u

There are two possible settings:
- timed humidifier On/Off operation;
- timed humidity set point control.

In addition, both functions can be enabled to work at the same time.

4.6.1 Timed humidifier On/Off operation

This function can be used to set humidifier on and off times specifically and separately for each day of the week. Once the humidifier is on, the production of humidity depends only on the control parameters set (see par. 4.3.4) and the humidity measured.

Sequence:
- go to the "scheduler" screen (Fig. 4.a.v) set the field to the right of "On-off timezones" to "Yes";
- press "ENTER" to confirm.

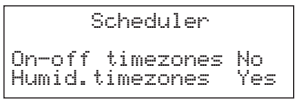


Fig. 4.a.v

This then activates the following time band control screens. To display these, position the cursor (using "ENTER") at the top left and then press "UP" and "DOWN" to scroll the screens.
Four different time bands can be selected:

Setting the ON-OFF bands

time band		ON	OFF	description
S1	S1-1	09:00	13:00	the humidifier remains on (the values in the table are the default values. These can be modified by moving the cursor to the values and using the "UP" or "DOWN" button").
	S1-2	14:00	21:00z	
S2		14:00	21:00	the humidifier remains on (the values in the table are the default values, which can be modified)
S3		Always ON		Humidifier always on
S4		Always OFF		Humidifier always off

Tab. 4.q

Once the time bands have been set, the bands then need to be enabled for each day.
An example of the screen is shown below (Fig. 4.a.z).

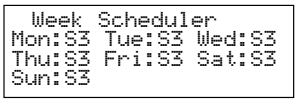


Fig. 4.a.z

Sequence:
- use the "ENTER" button to move the cursor to the time band for the day in question;
- use the "UP" and "DOWN" buttons to choose one of the 4 time bands shown in Tab. 4.n;
- press "ENTER" to confirm and move to the next value.

Example of a time band setting (Fig. 4.b.a).

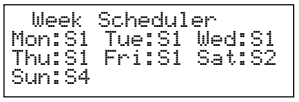


Fig. 4.b.a

4.6.2 Timed set point control (only available in control mode with probe)

With this type of control, the humidity H (or temperature T) set point can be varied during the day.
Up to 4 switching points can be set, with both the time and new set point. This setting is valid for every day of the week.
Sequence:

- go to the screen (fig. 4.b.b) and set the field to the right of "Humid. timezones" to "Yes";
- press "ENTER" to confirm.

```
      Scheduler

On-off timezones No
Humid.timezones  Yes
```

Fig. 4.b.b

This then activates the following control screens for the set point switching points (position the cursor using "ENTER" at the top left and then press "UP" and "DOWN").
To set the switching points, go to the following two screens (Fig. 4.b.c).

```
      Set point
       ON      SET
Z1:   00:00   000.0%
Z2:   00:00   000.0%
```

```
      Set point
       ON      SET
Z3:   00:00   000.0%
Z4:   00:00   000.0%
```

Fig.4.b.c

Setting the switching points:

- press "ENTER" to move the cursor to the desired field;
- use "UP" & "DOWN" tto set the desired time and the new humidity set point for that time band;
- press "ENTER" to confirm and move to the next field.

Figures 4.b.d and 4.b.e show an example of the time band settings. The graph in Figure 4.b.f represents the trend in the set point throughout the day.

```
      Set point
       ON      SET
Z1:   08:30   050.0%
Z2:   12:30   040.0%
```

Fig. 4.b.d

```
      Set point
       ON      SET
Z3:   13:30   050.0%
Z4:   18:00   030.0%
```

Fig. 4.b.e

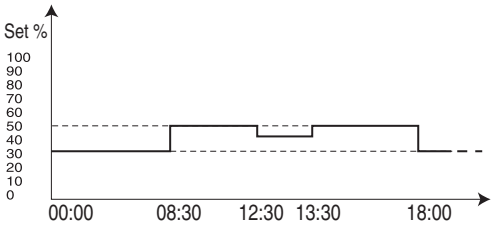


Fig. 4.b.f

4.6.3 Combined control

The activation of both control modes is used to set both the humidifier ON/OFF times and the set point values during the day. To do this, both the values in the fields on the screen shown (Fig. 4.b.g) must be set to "Yes".
This will enable all the subsequent screens for setting the time bands and the set point.

```
      Scheduler

Humidif. on-off  Yes
Set point        Yes
```

Fig. 4.b.g

4.7 "Alarm log" submenu

The humidifier memory can record the alarms that are activated during the life of the humidifier.
The memory saves up to 200 events, and information is available both on the type of alarm and on the date and time it occurred. To access the alarm log, simply go to the "Alarm log" submenu ("History Alarms"). Use the "UP" and "DOWN" buttons to scroll all the events that have been saved (the number of the event is shown in the top right of the screen).

4.8 "Unit On-Off" submenu

To start the unit, proceed as follows:
a. press "PRG. The "Menu" screen is displayed.
Scroll with the "DOWN" arrow until moving the cursor to "ON OFF UNIT", Fig. 4.b.h.

```
        Menu
. Alarm History
 > Unit On-Off
. Set
```

Fig. 4.b.h

b. press "Enter". The "Unit Status" screen is displayed (Fig. 4.b.i).
Press "Enter". The main screen is automatically displayed.

```
Unit status:
Off by Keyboard
- Press ENETR to  -
- enable -
```

Fig. 4.b.i

At this stage, the system is on and the operation of the humidifier can be started (see paragraph 4.3 "Set submenu") when requested, steam production starts. To switch the unit off (Off from keypad), simply repeat the same operations.

5. STARTING, SHUTTING DOWN AND ADVANCED FUNCTIONS

5.1 Starting

Procedure and sequence

I – 0 switch: on/off (Fig. 5.a).

Fig. 5.a

humidifier, switch on the appliance by moving the rocker switch to position "I".
The start-up sequence then begins, which includes an initial phase followed by the operation of the appliance.
After the switch has been moved to the On position, the graphic display shows the screens in the sequence described in the figures below.

1. Start power supply, system boot (around 10 seconds)
   Nothing is displayed (Fig. 5.b);

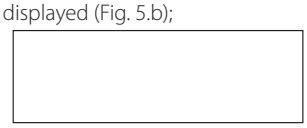


Fig. 5.b

2. Language setting (around 30 seconds)
   IIn this phase, the user has 30 seconds to change the language, Fig. 5.c. To skip directly to the next phase, press the "ESC" button.

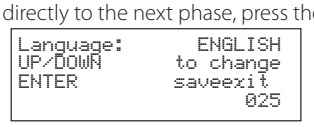


Fig. 5.c

3. End Autotest: treated water mode

Note: treated water is defined as described on the Par. 3.1 - gaSteam Hardware manual - cod. +030220940.

Aftern than the language is selected, the screen shown (Fig. 5.d) is displayed, used to enable/disable operation with treated water and set the number of evaporation cycles between two drain for dilution cycles (default is treated water mode).

- pressing "ALARM" confirms the settings displayed and exits the screen;
- pressing "ENTER" positions the cursor in the field that is used to enable or disable the "treated water" mode, by pressing the "UP" or "DOWN" buttons;
- pressing "ENTER" again moves to the field for setting the number of cycles, "UP" and "DOWN" change the value.
- pressing "ENTER" again and then "ALARM" confirms the values set and exits the screen.

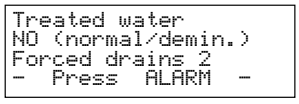


Fig. 5.d

IMPORTANT: The value set by default for the number of evaporation cycles between two drain cycles (Force drain cycles) is the value recommended by the manufacturer.
To change this setting without causing operating problems, contact qualified personnel

4. End Autotest: setting the heating value of the supply gas

After exiting the "Treated water" screen, the screen shown (Fig. 5.e) is displayed, which prompts the user to set or confirm the HHV (higher heating value) of the supply gas in Kj/m3. This option has been made necessary for different regions of the world where the humidifier may be installed. The heating value is provided by the gas company.

- pressing "ALARM" confirms the value displayed and exits the screen;
- pressing "ENTER" allows the value to be set using the "UP" and "DOWN" buttons;
- pressing "ENTER" again confirms the value set and then pressing "ALARM" exits the screen.

IMPORTANT: The value set determines the correct operation of the humidifier. Contact qualified personnel before changing it.

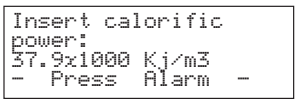


Fig. 5.e

5. Autotest and settings.

The AUTOTEST procedure is enabled by default and consequently at start-up the main functions of the unit are automatically checked (fill, drain and control of the level sensor).
If enabled, the AUTOTEST procedure starts whenever the electronic controller is switched on. Nonetheless, the AUTOTEST procedure can be disabled (see par. 4.4.6).

6. Operating phase, main screen Fig. 5.f.

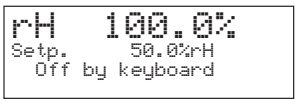


Fig. 5.f

5.2 Shutting down the unit

When shutting down the appliance at the end of the season or alternatively for maintenance on the electrical parts and/or water circuit, the humidifier should be placed out of service.
NOTE: empty the cylinder before shutting down the humidifier to prevent fouling.

Sequence:

- open the mains disconnect switch on the power line to the humidifier;
- move the rocker switch to 0 (see Fig. 5.g) and check that the display on the controller is off;
- close the shut-off tap on the water line to the humidifier.

Fig. 5.g

To empty the cylinder when shutting down, refer to par. 5.3.
In the event of a malfunction with the pump, or a malfunction with the electrical parts, the boiler can be emptied manually using the "manual drain tap" (Fig. 5.h), where it is necessary to connect a pipe to drain the water external.

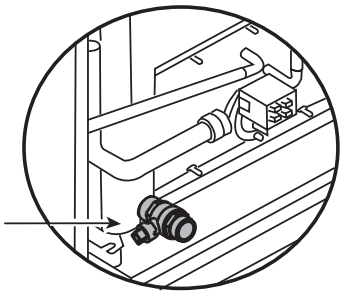


Fig. 5.h

5.3 Manually draining the boiler

The cylinder can be drained manually to complete empty the water contained inside.
This operation is particularly useful when maintenance needs to be performed on the boiler, the exchangers or the burners, or alternatively when the humidifier needs to be shut down at the end of the season.

The sequence to start the manual drain cycle is as follows:
- press the UP and DOWN arrows together for 5 seconds until the drain cycle is activated.

Once the drain cycle is terminated, the humidifier returns to the same operating conditions as prior to the drain cycle.

NOTE: the duration of the complete boiler drain cycle is preset. Nonetheless, manual drain can be stopped by pressing the UP and DOWN buttons again for 5 seconds.

If the cylinder needs to be replaced, when the manual drain is complete the humidifier must be switched off.

5. 4 Cascading control of other units

Steam production higher than the rated output of the master unit can be achieved by connecting one or more slave units:
- Master: UG unit fitted with analogue output for controlling other units;
- Slave: UG unit that works based on the analogue signal control received from the master.

Parameter P0 on each unit (master or slave) uniquely defines the steam production on that unit.
If the master is disabled by the remote contact or serial connection, production on the slaves also stops. Some alarms also shut down the slaves.

GRAPH

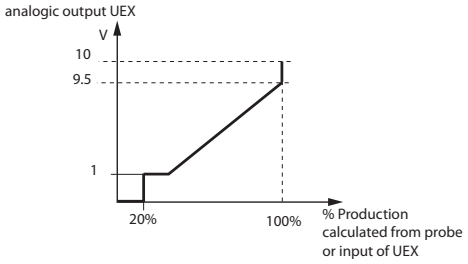


Fig. 5.i

Diagram: example 1

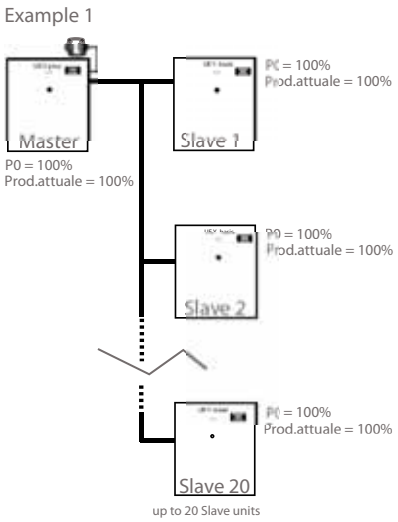


Fig. 5.l

Diagram: example 2

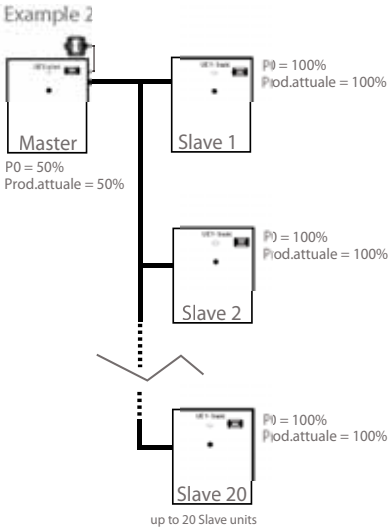


Fig. 5.m

Diagram: example 3

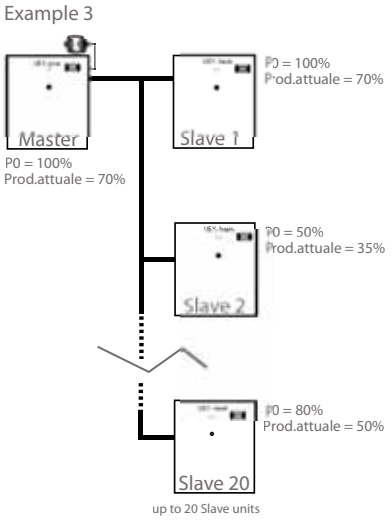


Fig. 5.n

Connection between UG Master & UG Slave
Use shielded cable for the connection.

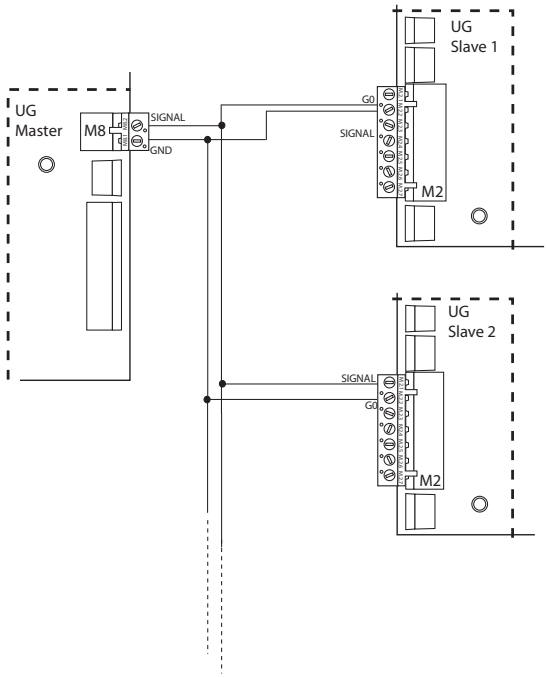
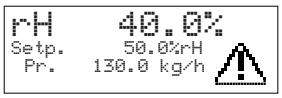


Fig. 5.o

6. ALARMS, TROUBLESHOOTING

6.1 Alarms

When an alarm is activated, the alarm button starts flashing intermittently, and the display shows the alarm icon.
In these conditions, pressing the alarm button once displays the type of alarm (and the code).



In the event of potentially dangerous alarms, the controller automatically stops the production of steam.
For some alarm events (see Tab. 6.a), as well as the signal, the alarm relay is activated, described in par. 3.1.
If the causes of the alarm are no longer present, the humidifier and alarm relay can be reset automatically or manually, depending on the type of fault, while the message displayed is cancelled manually (see Tab. 6.b).
Even if no longer active, the alarm status continues to be indicated until the "reset display" button is pressed.

The alarms that are still active cannot be reset.
IIn the event where more than one alarm is active, the display indicates all the codes in sequence, only if after having pressed the alarm button once, the "UP" or "DOWN button is also pressed.

6.2 Alarm management and signals

Table of alarms

Meaning	Cause	Solution	Reset	Alarm codes displayed (2)= alarm relating to cylinder 2	Alarm relay	Action
Low production alarm	• power not available; • with the unit on, there is no steam production; • flue or air inlet blocked; • gas tap closed; • malfunction of the burner and/or the controller.	• check the pressure of the gas and that the gas tap is open; • check that the air inlet is free; • check the power connection to the fan; • check the operation of the brushless fan, the flue and the air inlet; • burner flame malfunction; check the connections between the flame control board and the burner and between the electrical panel and the flame control board; • check the connections between the control unit and the terminal block inside the electrical panel.	manual	Alarm: EP Low Production (Burners Off)	active	stop production
No water	no water supply	• check that the supply pipe to the humidifier and the internal tubing are not blocked or choked and that there is enough pressure (0 to 1 to 0.8 MPa, 1 to 8 bars); • check the operation of the fill solenoid valve and that the filter is clean; • check that there is not excessive back-pressure in the steam outlet, causing the activation of the overflow;check that the steam outlet pipe is not choked or that there are no pockets of condensate	automatic	Alarm: EF No Water (Burners Off)	active	activate auto proc.
High conductivity alarm	high conductivity of the supply water	• check the threshold set; • switch the unit off and clean the electrodes that measure the conductivity of the water;if the problem persists, change the origin of the supply water or add a suitable treatment system, (demineralisation, even partial). N.B.: the problem is not resolved by softening the supply water.	manual	Alarm: EC High Conductivity (Burners Off)	active	stop production
High conductivity warning	high water conductivity pre-alarm	• check the conductivity of the supply water; if necessary, add a suitable water treatment system. N.B.: the problem is not resolved by softening the supply water.	automatic	Pre-alarm: Ec High Conductivity	not active	signal only

Meaning	Cause	Solution	Reset	Alarm codes displayed (2)= alarm relating to cylinder 2	Alarm relay	Action
High humidity warning	high humidity in the room	check the operation of the probe and the value set for the upper limit parameter	automatic	Pre-alarm: E- High Humidity	not active	signal only
Low humidity warning	low humidity in the room	check the operation of the probe and the value set for the lower limit parameter	automatic	Pre-alarm: E_ Low Humidity	not active	signal only
High temperature warning	high temperature in the room	check the operation of the probe and the value set for the upper limit parameter	automatic	Pre-alarm: E> High Temperature	not active	signal only
Low temperature warning	low temperature in the room	check the operation of the probe and the value set for the lower limit parameter	automatic	Pre-alarm: E_ Low Temperature	not active	signal only
High outlet humidity alarm	high outlet humidity	check the operation of the outlet probe	automatic	Pre-alarm: E= Humidity Alarm Limit probe	not active	signal only
Main probe disconnected alarm	room probe not connected	check the connection of the probe, the parameter A2 for the room probe and the setting of parameter A0 (see chap. 4)	automatic	Alarm: E3 Room probe not connected or damaged	active	stop production
Outlet probe disconnected alarm	outlet probe not connected	check the connection of the probe, the outlet humidity limit parameter and the setting of the "type of control" parameter.	automatic	Alarm: E4 Limit probe not connected or damaged	not active	signal only
Foam alarm	excessive foam in the cylinder during the boiling phase	the formation of foam is generally due to the presence of surfactants in the water (lubricants, solvents, detergents, water treatment or softening agents) or an excessive concentration of dissolved salts: • purge the water supply lines; • clean the cylinder; check for the presence of a softener (in this case, use another type of water or reduce the softening).	automatic	Pre-alarm: EA Foam Present	not active	signal only
Cylinder full	cylinder full signal with unit off	with the unit off: • check for any leaks from the fill solenoid valve or the return of condensate from the pipe; • check and clean the level sensors.	automatic	Pre-alarm: EU Boiler Full	not active	signal only
Test alarm	Autotest failed; probable problems in water supply, level control or water drain cycle	• make sure that the unit receives water (1-8 bars; 0.1-0.8 MPa; 14.5-116 PSI); • make sure that the unit drains the water; • switch the unit off and clean the level control and the fill valve, the pump and the drain filter.	manual; turn the unit off and on again	Alarm: EE Test Alarm (burners off)	active	stop production
Low level alarm	low level of the water in the cylinder or fault with the level control	check the correct supply of water to the cylinder; switch the unit off and clean: the cylinder, the level control and the fill solenoid valve	manual	Alarm: EL Min. Water Level (burners off)	active	stop production
NTC probe disconnected	NTC water temperature not connected	check the operation of the preheating function and the setting of the parameters; check the connections on the terminal block on the cover of the cylinder	automatic	Alarm: E5 NTC probe not connected or damaged	active	preheating deactivated
System fan 1 (2) warning	fan error	check the electrical connections between the control board and the fan	automatic	Warning ED	not active	decreased fan speed
System fan 1 (2) alarm	fan error	check the electrical connections between the control board and the fan; if necessary, remove the brushless fan and check its operation	manual	Alarm: Ed Fan Alarm 1 (2) (burner 1 (2) off)	active	stop production on corresp. burner
System thermostat 1 (2) alarm	safety thermostat activated due to abnormal overheating of the cylinder sue to operation without water	stop the unit and perform complete maintenance on the cylinder	manual	Alarm: Et Klixon 1 (2) (burner 1 (2) off)	active	stop production on corresp. burner

Meaning	Cause	Solution	Reset	Alarm codes displayed (2)= alarm relating to cylinder 2	Alarm relay	Action
Clock error	backup battery completely discharged or general problems with the clock	replace the controller.	manual	Clock Card Alarm	not active	signal only
High flue gas temperature warning: Maintenance recommended	flue gas temperature higher than normal operation, presence of lime scale	carry out maintenance and/or clean the exchanger	automatic	Pre-alarm: ER -High Flue Gas Temp. (2) Boiler Maintenance 135 °C= UG45 180 °C= UG90-180	not active	signal only
High flue gas temperature alarm	flue gas temperature excessively high, boiler full of lime scale	switch the unit off, clean the exchanger, check burner calibration	manual	Alarm: ER High Flue Gas Temp. (2) (Burner off) 145 °C= UG45 190 °C= UG90-180	active	stop production on corresp. burner
Level sensor blocked warning	lime scale on the sensor	carry out maintenance on the level sensor	automatic	Pre-alarm: EL -Level sensor blocked	not active	activate auto proc.
Level sensor blocked alarm	no more attempts to unblock	carry out maintenance on the level sensor	manual	Alarm: EL - Level sensor fault	active	stop production
Drain warning	filter blocked, level sensor tube blocked, drain pump malfunctioning	carry out maintenance	automatic	Pre-alarm: CL - Drain maintenance	not active	signal only
Drain alarm	drain pump broken, filter blocked, level sensor tube blocked	carry out maintenance	manual	Alarm: CL - MDrain maintenance	active	stop production

Tab. 6.a

6.2.2 Resetting the alarms

The alarms are signalled by the flashing of the alarm button and display of the alarm icon ⚠.

The alarms are reset in the sequence shown in the following table:

sequence	effect
Pressed once	displays the alarm code. (NOTE: in the event where more than one alarm is present, to display all the alarms, after pressing the alarm button the first time, press the "UP" or "DOWN" buttons)
Pressed a second time	if the causes of the alarm are no longer present, resets the alarm and the alarm relay (in the alarms where this is activated)
Pressed a third time	if the causes of the alarm are no longer present, resets the display of the alarm and cancels the following screen: Nessun Allarme Attivo
Pressed a fourth time	returns to the main screen

Tab. 6.b

7. OPERATING AND CONTROL PRINCIPLES, OTHER FUNCTIONS

7.1 Operating principle

In a gas-fired humidifier, the production of steam is obtained inside a boiler containing water that is heated to and then held at boiling temperature.
The heat required to boil the water is provided by one or two burners that burn a mixture of air/gas. The heating capacity of the flame created due to combustion is modulated by adjusting the speed of the brushless fans fitted on the burners.
During the normal operation of the gaSteam, the level of the water is monitored using a three-float level sensor. In stable operation, there are repeated periods in which the water is filled and the level rises, and periods of evaporation in which the level falls. In these phases, the level remains between the middle and top floats.
Due to these repeated fill/evaporation cycles, the conductivity inside the boiler increases due to the progressive accumulation of salts introduced with the water. The control logic therefore periodically drains the water and replaces it with fresh mains water, so as to eliminate part of this excessive salinity.

7.2 Control principles

The range of humidifiers includes the following control options.

ON/OFF control

The action is all or nothing, activated by an external contact that determines the set point and the control differential.
The external contact may be a humidistat:
- closed: the humidifier produces steam if the remote ON/OFF contact is also closed;
- open: the production of steam ends after the completion of the evaporation cycle in progress (max. 10 to 15 min from the opening of the contact).

Note that if the remote ON/OFF contact opens, the production of steam ceases immediately, irrespective of the point that the current evaporation cycle has reached.

Proportional control

The production of steam (hourly quantity) is proportional to the value of a signal, Y, from an external device; the type of signal can be selected between the following standards: 0 to 1Vdc, 0 to 10Vdc, 2 to 10Vdc, 0 to 20mA, 4 to 20mA. The entire range is indicated as BP (proportional band).
The maximum production of the humidifier, corresponding to the maximum value of the external signal, can be programmed (by setting the Max.Product. parameter) from 25% to 100% of the rated output of the humidifier.
The minimum production, Min. Prod., has an activation hysteresis, hy, equal to 5% of the range BP of the external signal Y.

1. Steam production.
In the case of the UG180 humidifier, the following types of control sequence are available.

model	type of sequence	min. prod. range %	type of gas
UG180	parallel	25% - max prod.%	natural gas
	parallel with rotation	12.5% - max prod.%	
	series	12.5% - max prod.%	

Tab. 7.a

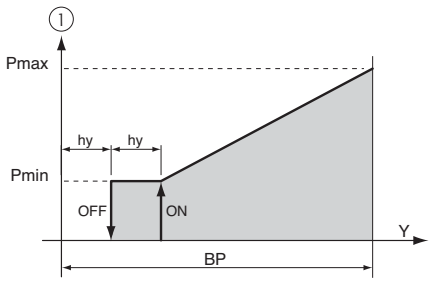


Fig. 7.a

Autonomous control with relative humidity probe

The production of steam is related to the % rH reading made by the relative humidity transducer connected to the controller, and increases as the value read deviates from the set point St. The maximum production, which is delivered when the relative humidity is less than the set point by a value at least equal to the differential ("H differential"), can be programmed (by setting the Max.Product. parameter) from 20% to 100% of the rated output of the humidifier, in operation with the parallel sequence, and from 10% to 100% in operation with the series sequence (see par. 4.3.5).
The minimum production, Min. Prod. (10% or 20%, depending on the operating sequence selected), has an activation hysteresis, hy, equal to 2% of the range.
The dehumidification function, if enabled (par. 4.4.11), overlaps the control diagram and is activated when the relative humidity % rH, sent by the transducer, is higher than St by a set amount ("dehum.offset"); the hysteresis of the step, also programmable, is "dehum.diff.".
To check that the relative humidity measured by the transducer is within certain preset values, two alarm thresholds can be set in autonomous control:
- high relative humidity alarm threshold;
- low relative humidity alarm threshold.

When these thresholds are exceeded, an alarm is activated, after a delay of 60 seconds.

1	steam production	3	dehumidification
2	activated	4	deactivated

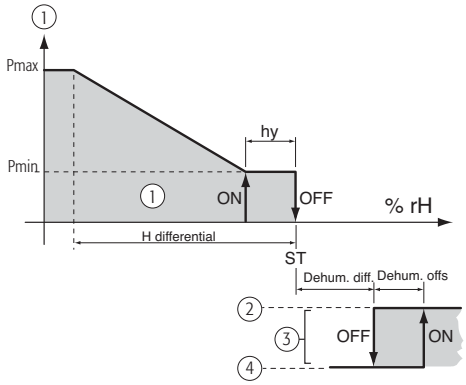


Fig. 7.b

Autonomous control with relative humidity probe and outlet humidity limit probe

The controller modulates steam production as a function of the % rH measurement performed by the relative humidity transducer, however, in addition, steam output is limited if the relative humidity % rH2 measured by a second compensation transducer placed in the air duct downstream from the humidifier exceeds the maximum desired value.
The compensation probe has its own set point ("L set point") and differential ("L differential"), based on which the limit in production is calculated (see Fig. 7.c).

The overall steam production is equal to the difference between the steam request from the main transducer and the request from the compensation transducer.

To prevent the relative humidity measured by the transducer in the air duct downstream from the humidifier exceeding a value considered as excessive, in this control mode a high outlet relative humidity alarm threshold can be set (also see par. 4.3.4).
This threshold is equal to the sum between the limit set point ("L set point") and an offset ("High Offset"). When this threshold is exceeded, an alarm is activated, after a delay of 60 seconds.

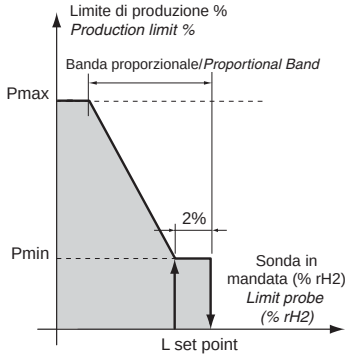


Fig. 7.c

Application for steam baths: autonomous control with temperature probe
In applications for steam baths, in which the control probe measures the temperature rather than the humidity, the same principles are true as described in the previous paragraphs, with the temperature replacing the humidity. In this operating mode, the dehumidification function is not available.

Recommended transducer: ASET030001.

High temperature limit 60°C.

7.3 Other functions

Measuring the conductivity of the supply water
The controller measures the conductivity of the supply water.
The measurement is made using the conductivity meter by opening the fill solenoid valve.
The field of reading ranges from 0 to 1500 µS/cm. Two thresholds are available:
- **pre-alarm threshold (signal only, without activating the alarm relay, and automatic reset when the condition is no longer present**);
- **alarm threshold (production stops, activation of the alarm relay**).

The alarm is activated when the reading exceeds one of the two thresholds continuously for 60 minutes, or alternatively instantly if the value read is 3 times higher than the threshold.
To disable either of these thresholds, simply set the corresponding value to a number outside of the field of reading the conductivity meter, that is, greater than 1500 µS/cm.

Measuring the flue gas temperature
The temperature of the flue gas is constantly monitored so as to ensure correct operation. The field of reading ranges from 0 to 200°C. Within these limits a number of operating thresholds are set:
- no production threshold: if the flue gas temperature falls below this value, it means that the burner is not on and the no production alarm (Ep) is activated;
- pre-alarm threshold: first upper threshold, above this value the recommended maintenance warning is activated. Also used to switch the burner to safety mode following abnormal operation with insufficient water in the boiler;
- alarm threshold: above this value production is stopped and the high temperature alarm (ER) is activated

The alarms or warnings are activated if the temperature reaches and then stays above these thresholds for at least 20 seconds. In the case when the pre-alarm threshold is used to switch off the burner in certain situations, such as drain cycles that last too long, activation is brought forward to 4 seconds.

Automatic draining
Automatic draining is managed by the controller: part of the water contained in the cylinder is drained automatically, and replaced with fresh water to prevent an excessive concentration of salts following the process of evaporation.
The drain pump is operated for a set time when the number of fill/evaporation cycles exceeds a limit calculated automatically, based on the conductivity read by the conductivity meter.

Antifoam procedure
With certain types of supply water, foam may form during the production of steam just above the water; this situation must be resolved, as it may cause water to be released together with the steam.
For this purpose, two electrodes are fitted on the ceiling of the cylinder. When these electrodes detect the presence of foam, a drain procedure is started to resolve the problem. The procedure consists of repeated drain cycles, while in more extreme situations, the "foam present" pre-alarm is shown.

Dehumidification request signal
If activated, this function closes the contact of a relay when the relative humidity measured by the transducer connected to the control module exceeds the set threshold. This signal can be used to start an external dehumidification appliance (also see par. 3.2)

Automatically empty the cylinder due to extended inactivity
If the cylinder remains on but without steam production for a number of days equal to the value set for the parameter described in par. 4.4.11 (default 3 days), the controller completely empties the water contained inside the cylinder. This function prevents the corrosion of the electrodes due to saline water if the humidifier is not operated for extended periods. The function can be disabled (see par. 4.4.11).

Automatic resumption from no water
If the supply of water is interrupted (mains water stoppage, fault in the osmosis or softening system), the controller stops normal operation and enters a special phase in which production is disabled so as to avoid dry operation. In this situation, the return of the supply water is checked every 10 minutes, and production is not resumed until water returns. During this phase the EF alarm is displayed.

7.4 Controlling the board via the network

The variables shown in the list are only one set of all the internal variables.
DO NOT CONFIGURE VARIABLES THAT ARE NOT LISTED IN THE TABLE, OTHERWISE THE OPERATION OF THE HUMIDIFIER MAY BE AFFECTED.

Address	Type	Access	Variable name	Description
1	DIG	R	SYSON	Syson
2	DIG	R	FILL_OUT	Fill solenoid valve ON
3	DIG	R	DRAIN_OUT	Drain solenoid valve ON
4	DIG	R	DEHUMIDIFIC	Dehumidifier relay ON
5	DIG	R	ACT_BURNER	Burner 1 board power relay status
6	DIG	R	ACT_BURNER2	Burner 2 board power relay status
7	DIG	R	ACT_FAN1	Fan 1 power relay status
8	DIG	R	ACT_FAN2	Fan 2 power relay status
9	DIG	R	ALARM	Unit alarm
10	DIG	R/W	BMS_ON_OFF	On/Off from supervisor
11	DIG	R/W	EN_DEHUMID	Enable dehumidifier
12	DIG	R/W	ENABLE_HUM	Enable humidifier
13	DIG	R/W	RES_HOUR_BURN1	Reset burner 1 hour counter
14	DIG	R/W	RES_HOUR_BURN2	Reset burner 2 hour counter
15	DIG	R/W	RES_HOUR_GASTEAM	Reset GaSteam hour counter
16	DIG	R/W	MANUAL_DRAIN	Manual drain
17	DIG	R/W	EN_AUTOTEST	Enable autotest
18	DIG	R/W	EN_NO_FROST	Enable antifreeze
19	DIG	R/W	MEASURE	Unit of measure
20	DIG	R	mal_ambient_probe	Control probe error
21	DIG	R	mal_clock	Clock card error
22	DIG	R	mal_fan1	Fan 1 alarm
23	DIG	R	mal_fan2	Fan 2 alarm
24	DIG	R	mal_foam_level	Foam alarm
25	DIG	R	mal_full_boiler	Boiler full alarm
26	DIG	R	mal_high_conductivity	High conductivity alarm
27	DIG	R	mal_high_humid	High temperature/humidity alarm
28	DIG	R	mal_high_outlet_gas1	PTC 1 alarm
29	DIG	R	mal_high_outlet_gas2	PTC 2 alarm
30	DIG	R	mal_klixon_fan1	Fan 1 thermal cutout alarm
31	DIG	R	mal_klixon_fan2	Fan 2 thermal cutout alarm
32	DIG	R	mal_limit_humid	High humidity limit probe alarm
33	DIG	R	mal_limit_probe	Limit probe error
34	DIG	R	mal_low_humid	Low temperature/humidity alarm
35	DIG	R	mal_low_production	Low production alarm
36	DIG	R	mal_maint_global	Maintenance recommended
37	DIG	R	mal_miss_water	No water alarm
38	DIG	R	mal_preheating_probe	NTC probe error
39	DIG	R	mPreAl_High_Conductivit	High conductivity pre-alarm
40	DIG	R	mLow_Level_Alarm	Minimum level alarm
41	DIG	R	mAutotest_Alarm	Test alarm
42	DIG	R	mAl_Pre_High_Outlet_	PTC 1 pre-alarm
43	DIG	R	mAl_Pre_High_Outlet_Gas2	PTC 2 pre-alarm
44	DIG	R	mal_ov_fan1	Fan 1 high speed alarm
45	DIG	R	mal_ov_fan2	Fan 2 high speed alarm
46	DIG	R	Res_Al	Reset alarms
57	DIG	R	Low_Level	Low float level sensor
58	DIG	R	Medium_Level	Medium float level sensor
59	DIG	R	High_Level	High float level sensor
60	DIG	R	Foam_Level	Foam level sensor

Address	Type	Access	Variable name	Description
1	INT	R	UNIT_STATUS	Humidifier status
2	INT	R	FAN_RPM1	Fan 1 speed
3	INT	R	AN_RPM2	Fan 2 speed
4	INT	R	COND_PARAM	Conductivity measured
5	INT	R	BURNER1_STATUS	Burner 1 status
6	INT	R	BURNER1_ACTIVITY	Burner 1 activity
7	INT	R	BURNER2_STATUS	Burner 2 status
8	INT	R	BURNER2_ACTIVITY	Burner 2 activity
9	INT	R	RUNNING_HOURS_H1	Burner 1 operating hours- x1000
10	INT	R	RUNNING_HOURS_L1	Burner 1 operating hours
11	INT	R	RUNNING_HOURS_H2	Burner 2 operating hours- x1000
12	INT	R	RUNNING_HOURS_L2	Burner 2 operating hours
13	INT	R	RUNNING_HOURS_GH	GaSteam operating hours - x1000
14	INT	R	RUNNING_HOURS_GL	GaSteam operating hours
15	INT	R	MODEM_STATUS	Modem status
16	INT	R	LANGUAGE	Language selected
17	INT	R	HOUR	Current hours
18	INT	R	MINUTE	Current minutes
19	INT	R	DAY	Current day
20	INT	R	MONTH	Current month
21	INT	R	PYEAR	Current year
22	INT	R	WEEK_DAY	Current day of the week
23	INT	R/W	REGULATION_TYPE	Type of control
24	INT	R/W	AMBIENT_PROBE_TYPE	Room probe type
25	INT	R/W	ROTATION_TYPE	Type of rotation
26	INT	R/W	PREHEATING_TYPE	Type of preheating
27	INT	R/W	IDENT	Identifier number for BMS Network
28	INT	R/W	BAUD_RATE	Communication speed
29	INT	R/W	PROTOCOL_TYPE	Type of protocol
30	INT	R/W	CYL_SEQUENCE	Type of management requested (parallel, series)
31	INT			Flue gas temperature 1
32	INT			Flue gas temperature 2

Address	Type	Access	Variable name	Description
1	ANA	R	VIS_VALUE	Control probe/signal
2	ANA	R/W	AMBIENT_PROBE_MIN	Room probe configuration minimum limit
3	ANA	R/W	AMBIENT_PROBE_MAX	Room probe configuration maximum limit
4	ANA	R/W	AMBIENT_PROBE_OFFSET	Room probe calibration offset
5	ANA	R	ACT_SETPOINT	Current set point
6	ANA	R	A_PRODUCTION	Current steam production
7	ANA	R	LIMIT_PROBE_VALUE	Signal applied to the limit probe input
8	ANA	R/W	LIMIT_PROBE_MIN	Limit probe configuration minimum limit
9	ANA	R/W	LIMIT_PROBE_MAX	Limit probe configuration maximum limit
10	ANA	R/W	LIMIT_PROBE_OFFSET	Limit probe calibration offset
11	ANA	R	NOMINAL_CAPACITY	GaSteam rated capacity
12	ANA	R	A_PRODUCTION1	Current production of combustion system 1
13	ANA	R	A_PRODUCTION2	Current production of combustion system 2
14	ANA	R	PREHEATING_PROBE_VALUE	Water temperature
15	ANA	R/W	MAX_PROD	Maximum production %
16	ANA	R/W	SET_HUMID	Humidity set point
17	ANA	R/W	DIFF_HUMID	Humidity differential
18	ANA	R/W	L_SETPOINT	Limit probe set point
19	ANA	R/W	L_DIFFERENTIAL	Limit probe differential
20	ANA	R/W	T_SETPOINT	Temperature set point
21	ANA	R/W	T_DIFF	Temperature differential
22	ANA	R/W	DEHUM_SET	Dehumidifier set point
23	ANA	R/W	DEHUM_DIFF	Dehumidifier differential
24	ANA	R/W	LOW_ROOM_HUMID	Low room humidity alarm threshold
25	ANA	R/W	HIGH_ROOM_HUMID	High room humidity alarm threshold
26	ANA	R/W	HIGH_LIMIT_HUMID	High outlet humidity alarm threshold
27	ANA	R/W	TEMP_PREHEATING	Preheating set point
28	ANA	R/W	NO_FROST_SETPOINT	Antifreeze set point

CAREL reserves the right to modify or change its products without prior notice.

NOTE: _____

NOTE: _____

"gaSteam CONTROLLER" +030220931 - rel. 1.1 - 02.07.2009

CAREL

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